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Bibliography on Specialized Forecasting Techniques, p. 372

I. 8 March 1957 No. 3

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 8 MARCH, 1957 No. 3

SPECIAL FEATURE IN THIS ISSUE

Recent Literature on Specialized Forecasting Techniques

by
Mary L. Rice

(*For complete table of contents see back cover*)

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LIST OF PERIODICALS

Note: This list contains the titles of the periodicals which regularly contain material on meteorology or related fields and it comprises only a small percentage of the periodicals from which pertinent articles are abstracted. The form of serial entry adopted by **MAB** is given in bold face type below.

PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

Académie des Sciences, Paris, Comptes Rendus.
★**Acta Geophysica Polonica,** [Warsaw].
Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. and **Ser. Geofiz.,** [Moscow].
American Geophysical Union, Transactions, [Washington.]
★**American Meteorological Society, Bulletin,** [Boston].
★**Angewandte Meteorologie,** [Potsdam].
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
★**Australian Meteorological Magazine,** [Melbourne].
★**Ciel et Terre,** Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
★**Geofisica e Meteorologia,** Società Italiana di Geofisica, [Genoa].
Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
★**Geophysical Magazine,** Japan Meteorological Agency, [Tokyo].
Hemel en Dampkring, [The Hague].
★**Időjárás,** Magyar Meteorólogiai Társaság and Országos Meteorológiai Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
★**Journal of Atmospheric and Terrestrial Physics,** [London].
Journal of Geophysical Research, [Washington]
★**Journal of Meteorological Research,** [Tokyo].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorological Society of Japan, Journal,** [Tokyo].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologiia i Gidrologiia,** [Leningrad]
★**Meteorologische Rundschau,** [Berlin].
★**Meteoros,** [Buenos Aires].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
Polarforschung, Archiv für Polarforschung, [Kiel, Germany].
★**Przegląd Meteorologiczny i Hydrologiczny,** [Warsaw]
Revista de Geofísica, Instituto Nacional de Geofísica, [Madrid].
★**Revista Meteorologica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Associazione Culturale Aeronautica, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**South Africa. Weather Bureau, Notos,** [Pretoria].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Moscow-Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** American Meteorological Society, [Boston].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**WMO Bulletin,** World Meteorological Organization, [Geneva].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ring to the attention of meteorologists current literature in their field and in related fields and o provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, tc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a pecial subject (usually arranged chronologically). No attempt is made to prepare exhaustive ibliographies; instead, the aim is to include a representative cross section of the various spects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm De-
. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	tect.

Vol. III, 1952

. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc
. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics
7. Radar Cloud Physics	8. Atmos. Nuclei (1841–1950)	9. Atmos. Nuclei (1951–1955)
0. Weather Modification	11. Cooling Power	

Vol. VII, 1956

1. Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
4. Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
7. Snow Micromet.	8. Snow Micromet. (Suppl.)	9. Tropical Cyclones
0. Hurricane Damage	11. Tropical Cyclone Theory	

Bibliographies published this year are:

. **Solar Relations with Weather,** Vol. 8, No. 1, Jan. 1957
. **Night Airglow,** Vol. 8, No. 2, Feb. 1957
. **Forecasting of Special Elements,** Vol. 8, No. 3, March 1957

Forthcoming bibliography will be:

Forest Micrometeorology, Vol. 8, No. 4, April 1957

Other bibliographies in preparation are:

Actinometers	*Ozone*
Forecasting of Hydrometeorological Elements	*Radio Astronomy*
Human Bioclimatology	*Singularities*
Microwave Propagation	*Synoptic Aerology*

Part III contains a listing of reviews, translations, reprints, and the contents of important ublications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue omprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau, Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

8.3–1 551.524.371:061.3

Germany. Deutscher Wetterdienst, **Vorträge über Frostschutz anlässlich der 1. Tagung der Arbeitsgemeinschaft Frostschutz am 22. November 1955 in Bonn (und der) Sonderbesprechung über die technischen Erfahrungen des Deutschen Wetterdienstes im Frostschutz am 26. April 1956 in Mainz.** [Papers on frost protection delivered at the first meeting of the Frost Protection Working Group on Nov. 22, 1955 in Bonn (and the) Special conference on the technical experience of the German Weather Service in frost protection methods on April 26, 1956 in Mainz.] Its *Mitteilungen*, 3(16), **1956.** 85 p. figs., tables, bibliogs. **DWB**—Four papers on frost protection of orchards and vineyards, presented at the Frost Protection Seminar at Bonn in Nov. 1955, and 5 papers on frost protection machines or equipment, presented at the April, 1956, session in Mainz are presented in this publication along with the list of participants and a list of frost warning service centers in Germany. Emphasis is placed on careful comparisons of the effectiveness of the several protective systems, as well as on the effectiveness of the warning service. (For contents, *see* p. 407, March 1957, *MAB*.) *Subject Heading:* **1. Frost protection Conferences.**—*M.R.*

8.3–2 551.584.6:629.123.4:061.3

Hamburg. Seewetteramt, **Laderaum-Meteorologie: Vorträge auf der Arbeitstagung am 20. Juni 1956 in Hamburg.** [Ships' hold meteorology: lectures at the seminar, June 20, 1956, at Hamburg.] Its *Einzelveröffentlichungen*, No. 9, **1956.** 43 p. figs., refs. Also: Baumann, G., **Eröffnung der Tagung durch den Leiter des Seewetteramtes.** [Opening of the meeting by the Director of the Seewetteramt.] p. 5–6. **DWB**—The first ships' hold climatology conference was held in Hamburg on June 20, 1956. Eight papers and a number of discussions were held on packaging, air conditioning, protection, deterioration and testing of conditions in ships' holds. The opening remarks by G. BAUMANN, director of the Seewetteramt, gave a brief history of work on these problems in England, the U. S. A. and Germany, International (WMO) work, and that being conducted in 9 different sub-fields by the Seewetteramt. For contents, *see* p. 408, March 1957, *MAB*. *Subject Headings:* **1. Ships' hold climatology 2. Applied climatology 3. Conferences. I. Germany. Deutscher Wetterdienst. Seewetteramt.**—*M.R.*

8.3–3 551.586:551.45(08)

†Institute of Biology, London, **Biology of deserts: the proceedings of a symposium on the biology of hot and cold deserts.** Ed. by J. L. Cloudsley-Thompson. London, Pub. by the Institute, **1954.** 223 p. figs., refs. throughout. **DWB**—This volume contains papers read at a Conference on **The Biology and Productivity of Hot and Cold Deserts,** organized by the Institute of Biology and held at the Royal Institution during Sept. 25th, 26th and 27th, 1952. The Symposium consisted of six sessions devoted to various aspects of desert biology: 1) Climate and Physical Environment, 2) Plant Ecology, 3) Entomology and Ecology, 4) Economic Aspects, 5) Mammalian Physiology and Ecology I and Mammalian Physiology and Ecology II. The individual papers will be abstracted separately. (For titles of individual papers, *see* this issue of *MAB*, p. 409.) *Subject Headings:* **1. Desert biology 2. Bioclimatology 3. Symposia. I. Cloudsley-Thompson, J. L.** (*ed.*).—*From editor's foreword.*

8.3–4 551.5(08

§*Beszámolók az 1955-ben végzett tudományos kutatásokról. [Reports on scientifi research in 1955.] Ed. by Frigyes Dési. *Hungary. Országos Meteorológiai Intézet, Hivatalo Kiadványai*, Vol. 20, 1955. 284 p. figs., tables, refs., eqs. Russian, German and Frenc summaries. **DWB**—Contains 25 papers (in Hungarian) reporting results of meteorologica research conducted in Hungary in 1955. Nine papers deal with analysis of weather develop ment in Hungary in 1952–1954, eight with the climatology of Hungary, two with long-rang forecasting, two with synoptic analysis, one with aerology, two with aeronautical meteorolog and one with ionospheric measurements. All articles will be abstracted separately. (Fo detailed contents, *see* p. 408, March 1957, *MAB*.) (Similar volumes have been published fo earlier years, presumably since 1951.) *Subject Headings:* **1. Meteorological research 2. Hun gary. I. Dési, F.** (*ed.*).—*G.T.*

TEXTBOOKS

See also: **Solar research, conclusions and problems** (Waldmeier), 8.3–15; **Air, sanitary protection** (Riazanov), 8.3–26.

8.3–5 551.5:63:581.1(02

*†Azzi, Girolamo (*Perugia Univ., Prof. of Agric. Ecology*), **Agricultural ecology.** Londo Constable & Co., Ltd., 1956. 424 p. 47 figs. (incl. photos), numerous tables, bibliog. p 403–415, numerous eqs. **DWB**—In 1947 the author published his **Ecologia Agricola** in Spanis (305 p.). This was reviewed in *MAB* (*see item* 2.4–180, April 1951). The present work is th first recent work of its kind in the English language. The broad and the specific aspects of cl mate and soil in relation to growth and yield of crops are covered in the 27 chapters, divided int 4 main parts: I, Agricultural climatology; II, Soil-climate complex; III, Yield and ecology of cu tivated plants; IV, Statistical analysis of yields in relation to climate, etc. The concepts an methods of agricultural meteorology, microclimatology, phenology, statistical analysis of cro growth and yields, etc., are covered under Pt. I. Specific crops in various parts of the worl (wheat, grapes, rice, apples, peanuts, potatoes, etc., etc.), their specific diseases (rust, blight . . . are considered in some detail. The author has been publishing articles on agricultural meteo ology or ecology since 1914, and has taught continuously in agricultural colleges of Italy Venezuela and elsewhere ever since. His first extensive work (in Italian) came out in Turi in 1928 (237 p.), and another Italian work in 1944 (204 p.). The 13 page bibliography in thi newest work (in English) is arranged by chapters and contains a great number of the author' papers, many references to Italian, Russian and German articles in this field (e.g., R. Milian A. Baltadori, P. I. Brounov, S. Ivanov, F. S. Bodenheimer, F. Schnelle and others and a few references to American or English works, through 1955. The extensive autho subject index gives an idea of the wide range of crops, regions and subjects covered. Revie in *Geophysica e Meteorologia*, Genoa, 4(3):60, May/June, 1956. *Subject Headings:* **1. Agri cultural ecology textbooks 2. Agrometeorology 3. Translations 4. Textbooks.**—*M.R.*

8.3–6 550.3(02) 551.58

Beckinsale, Robert Percy, **Land, air and ocean.** London, Gerald Duckworth & Co Ltd. 1956. 370 p. 140 figs. (incl. photos). **DWB**—This second revised and enlarged editio replaces the 1943 edition (which was reprinted in 1945, 1946 and 1949). A wealth of ne material and references to articles in the **Compendium of Meteorology** and other postwa works is incorporated. The book covers the broad fields of meteorology, oceanography seismology and geomorphology with brief coverage of other aspects of geophysics. Th atmosphere (p. 41–130), the oceans (p. 131–178), the land surfaces (p. 179–342), and th climate near the ground (p. 343–360) comprise the major sections apart from the introductor material on p. 21–40. The approach is nonmathematical but analytical—i.e., that of th physiographer. The final chapter, **Influence of Surface Cover on Local Weather,** is base entirely on recent practical work in applied meteorology. *Subject Headings:* **1. Geophysic textbooks 2. Microclimatology 3. Textbooks.**—*M.R.*

8.3–7 551.5(02)

Lester, Reginald Mountstephens. **Observer's book of weather.** London, Frederick Warne, **1955.** 151 p. 64 plates (some colored), 11 figs., tables. **DWB**—An unusual form of elementary meteorology text for the observer or amateur in a small pocket edition (<4″×6″) but with numerous excellent photographs, many in color. The upper atmosphere, air masses, winds, clouds, storm, dew, frost, fog, instruments and observations, weather maps, phenology, amateur weather records, elementary forecasting, long-range forecasting, world climates, and weather lore are treated in separate chapters. The latest (post-war) methods are considered in the light of experience in Great Britain. Most of the photographs are of weather in the British landscape. *Subject Headings:* **1. Elementary meteorology 2. Observers textbooks.**—*M.R.*

8.3–8 631.43(02)

*†Baver, Leonard David (*Dir., Experiment Station, Hawaiian Sugar Planters Assoc.*), **Soil Physics.** 3d ed. N. Y., John Wiley, **1956.** 489 p. 105 figs., 65 tables, 81 eqs., bibliog. at end of each ch. **DWB**—The various meteorological factors which effect soil structure, moisture, productivity or erosion, such as temperature, rainfall, evaporation, wind, pressure, etc., are given prominent place in the text, tables, charts, etc. of the appropriate chapters. Ch. IV of this textbook takes up various aspects of Soil-water systems; Ch. V, Soil structure; Ch. VI, Soil air; Ch. VII, Soil moisture; Ch. VIII, Irrigation; Ch. IX, Drainage; Ch. X, Soil temperature; Ch. XI, Physical properties of soil and tillage, and Ch. XII, Erosion by water and wind and the role of the soil in the hydrologic cycle. Good bibliographies appear at the end of each chapter. *Subject Headings:* **1. Soil physics textbooks 2. Soil moisture 3. Soil erosion 4. Soil temperature.**—*M.R.*

8.3–9 551.509:495.1

*Lu, Wo. **T'ien ch'i yü kao hsüeh.** [Weather forecasting.] Shanghai, Commercial Press, **1951.** 242 p. 69 figs., numerous tables, refs. In Chinese. **DLC**—A fine textbook on weather forecasting for a graduate course. Ch. 1. deals with Synoptic weather charts, 2. Cyclones and anticyclones, 3. Clouds and weather, 4. Thermodynamics of the atmosphere, 5. Airmasses, 6. Fronts, 7. Anticyclones and cold air, 8. Extra-tropical cyclones, 9. Weather analysis and forecasting, 10. Typhoons, 11. Thunderstorms, 12. General circulation of the atmosphere, 13. Air temperature and hoar frost, 14. Fog and haze, 15. Cyclic changes and topographic influences, 16. Weather types of China, 17. Local weather forecasting and weather proverbs, 18. Weather forecasting in practice. *Subject Headings:* **1. Weather forecasting 2. Chinese language 3. China.**—*H. Arakawa.*

MONOGRAPHS AND COMPREHENSIVE PAPERS

See also: **Antarctic program U. S.** (IGY, 1957/58. U. S. National Committee), 8.3–27; **Met. dictionary** (Wadati), 8.3–64; **Spring floods, U.S.S.R.** (Zaĭkov), 8.3–279; **Geog., Mexico** (Vivo), 8.3–286.

8.3–10 551.582.1(99) 551.46(269)

Cordini, Rafael, **Contribución al conocimiento del sector Antártico Argentino.** [Contribution to the knowledge of the Argentine sector of the Antarctic.] *Instituto Antarctico Argentino, Buenos Aires, Publication,* No. 1, **1955.** 277 p. 82+56 figs. (incl. photos), tables. **DWB, DPU**—In this voluminous and comprehensive coverage of all phases of the geography, glaciology, oceanography, geology and nature of the Argentine sector of the Antarctic, climatic data based on 1948–50 observations (3 years) at Deception Island are tabulated and discussed on p. 216–223. Temperatures to 3 meter depth in the ice, as well as surface data are included. Sea ice for the general Antarctic is covered on p. 88–149, bottom waters p. 150–173 and surface waters and thermals p. 174–214. Oceanographic data (surface temperatures, etc. and air temperatures) around Deception Island on p. 240–250, and climate of the Melchior Archipelago (incl. tables) based on 6 years of data (1947–52) on p. 256–7. *Subject Headings:* **1. Oceanography of Argentine sector of Antarctic 2. Climate of Deception Island, Antarctica 3. Climate of Melchior Archipelago, Antarctica 4. Antarctica.**—*M.R.*

8.3–11 551.582.1(984/5)

†*Leont'eva, E. A., **Klimat sovetskogo sektora arktiki.** [Climate of the Soviet sector of the Arctic.] *Leningrad. Arkticheskiĭ Nauchno-Issledovatel'skiĭ Institut, Trudy*, Vol. 195, **1947.** 499 p. 74 figs., 143 tables, 76 refs. **DWB**—A most detailed and satisfactory study of the climatic conditions in the eastern Arctic Basin and the islands, bordering seas and coasts, based on means, extremes and frequency distributions of the several meteorological elements and their interrelationships. The volume contains carefully selected and well arranged tables, sometimes quite extensive, in addition to the numerous graphs and mean or frequency charts and a systematic description or analysis of the elements and their significance. The generalities (physiography, oceanography, islands, ice, glaciation, flora and fauna) take up 17 pages of Introduction. In Ch. I, air pressure is considered from every possible angle—variability from year to year, month-to-month, day-to-day and hourly changes; variation with wind direction, air mass and season, frequency of deep cyclones and of rises and falls of pressure, of pressure waves of various amplitudes and duration thereof, diurnal and semi-diurnal waves, etc. In Ch. II wind direction, frequencies, prevailing winds and their constancy, wind speed frequencies, calms, diurnal variation (1, 7, 13 and 19 hour), maximum winds and gales by direction, maximum number of days a month with gales and whole gales, duration of gales, local winds and upper air winds (11 stations) are analyzed and data presented in extenso. In Ch. III the same treatment is given to temperature, using records from 86 stations, and considering the warming of the Arctic from 1920–45, (p. 229–234), the frequency of temperatures by months in 5°C class intervals (20 stations) and dates of first and last temperature of 10°, 5°, 0°, −5° . . . −30°, diurnal temperature variations and amplitude, absolute maximum and minimum, number of days of freezing and thawing and thermal wind roses and data therefor, effect of cloud amount, wind speed, calm, "severity" of weather, vertical temperature gradient, frequency of inversions, etc. Ch. IV takes up humidity (relative and absolute) at 4 synoptic hours; Ch. V, cloudiness including frequency of cloud types, cloudiness wind roses, etc.; Ch. VI, sunshine; Ch. VII, precipitation (frequencies of specified amounts), snow, rain and snow, frost, rime, glaze; Ch. VIII, snow cover (by decades and number of days per month); Ch. IX, blizzards and blowing snow; Ch. X, Thunderstorms (at Iugorskiĭ Shar as many as 13 have occurred in one year and 8 in one month, June); Ch. XI, Fog (frequency, mean number of days, greatest and least, dense fog, duration frequency of fog, fogs by wind direction and by wind speed groups and by temperature class intervals, diurnal variation in fog probability in summer); Ch. XII, Visibility (30 stations) by months and class intervals; Ch. XIII, Soil temperature (5 stations) and, finally, a summary of the climate and weather of the Soviet Arctic by seasons. The author and editor were both dead at the time the volume was published—it first came out in abridged form in 1942 or 43—there are only 3 or 4 references to literature after 1941 and in only a few cases does the data coverage extend past 1939. However, a marvelous amount of information has been extracted from the consistent records made during the 1930's at a network of 20–30 stations fairly well spaced along the Northern Sea Route, and in the deep estuaries, but no station not close to tide water has been used. The records of the "Fram," "Maudand," Severnyĭ Polius and Sedov drifting stations have been thoroughly analyzed and incorporated. The only thing that could have been added to make the study more useful to the synoptic meteorologist would have been a selection of typical synoptic charts for weather situations during the different seasons or for different areas. The bases for objective forecasting of the various elements, however, are abundantly scattered through the text, tables and charts, if one can rely on records of only a few years duration at a time when the weather might have been anomalous. *Subject Headings:* **1. Climate of Soviet Arctic 2. Climate of Arctic Basin 3. Climatic data for Arctic 4. Warming of Arctic 5. Soviet Arctic 6. Arctic Basin. I. Tikhomirov, E. I.** *(ed.).—M.R.*

8.3–12 551.582(99)

†*Tauber, G. M., **Osnovnye cherty klimata i pogody.** [Basic characteristics of climate and weather.] Leningrad, Gidromet. Izdat., **1956.** 146 p. 29 figs. (some fold.), 37 tables, 148 refs. *Moscow. Gosudarstvennyĭ Okeanograficheskiĭ Institut, Antarktika*, Vol. 1. **DWB.** Also his: **Osnovnye cherty klimata Antarktiki.** [The basic characteristics of the climate of Antarctica.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:13–18, Jan. **1956.** 2 figs. **DWB, DLC**—This book is the first real analysis and synthesis of all available meteorological data for

the Antarctic since the 1938 compilation of MEINARDUS in the Köppen-Geiger handbook. The work is based on data and information contained in about 150 publications, 56 of which are from Russian sources. The main sections of the book deal with: 1) Physico-geographic factors, 2) Climatic controls, 3) Atmospheric circulation in the Antarctic Seas, 4) Climatic conditions of the Antarctic, 5) Climatic and weather conditions in the vicinity of the Antarctic seas, 6) Aerological characteristics of Antarctica. The basic climatic data are for periods of varying length from 1898–1935, but the aero-synoptic analyses make use of the results of more recent (up to 1955) expeditions and publications. In the article in *Meteorologiia i Gidrologiia* the author presents a descriptive climatology of Antarctica including the peculiarities of seasonal temperatures, formation and movement of cyclones and anticyclones, characteristics of the wind regime, snowfall and erosional activity of snow, etc. Maps showing the paths of cyclones for each year of the period 1949–1952 and a map showing the mean pressure at sea level during the southern summer for the period 1949–1952 are presented. *Subject Headings:* **1. Climate of Antarctica 2. Antarctic weather 3. Antarctic seas 4. Antarctica.** *M.R., I.L.D.*

8.3–13 551.583:581.056

*†Schulman, Edmund (*Univ. of Arizona, Laboratory of Tree-ring Research*), **Dendroclimatic changes in semiarid America.** Tucson, Arizona, Univ. of Arizona Press, **1956.** 142 p. 42 figs. (incl. photo), 87 tables, 93 refs.—A major monographic compilation of facts and data on tree-ring analysis, rainfall records and their correlation, and on estimates of precipitation based on centuries old tree-ring records. The appendix contains an account of a recent discovery of pine trees at 10,000–11,000 ft elevation in the White Mountains of Nevada indicates ages of 3000–4000 years or more for several trees—older than the famous Sequoia (3200 years) and more indicative of drought-rainfall conditions since they are in a more marginal area and are more sensitive to rainfall variation than are the Sequoia. The several major chapters of the work comprise: I. Introduction, II. Problems of analysis, III. The tree-ring as a climatic gage, IV. Growth indices and climatic changes, V. Summary. Appendix A gives sample chronologies from 13 basins in the West; B, Dendroclimatology in Patagonia; C, Millennia-old pines sampled in 1954 and 1955. (*See also* 6.5–281, May 1955, *MAB.*) *Subject Headings:* **1. Dendroclimatology 2. Climatic changes 3. Rocky Mountains 4. White Mountains, Nevada.** —*M.R.*

8.3–14 551.579:551.578.46(79)(02)

†*U. S. Corps of Engineers, **Snow hydrology: summary report of the Snow Investigations.** Prepared by the North Pacific Div., U. S. Corps of Engineers, Portland, June 30, 1956. 437 p. tables, numerous plates (figs., fold.) throughout, and bibliographies (180 refs.). **DWB**—A voluminous and carefully prepared reference work containing an integration of the many studies made by the U. S. Weather Bureau, Corps of Engineers and other cooperating agencies in the Far West and Northwest during the past decade. Similar studies made in the U. S. A., Canada and in Europe have been reviewed and are cited in the respective chapters so that the work can be used by analogy almost anywhere that snow is encountered. The separate chapters, each containing many subdivisions and many appended references, data tables, graphs and charts, concern: 1) the general problem and objectives, 2) snow laboratory data, sites, quality equipment; 3) precipitation and snow cover (terrain effects, measurement techniques, water equivalent); 4) water balance (interception loss, evapotranspiration, soil moisture, storage and runoff), 5) melting (solar and terrestrial radiation, turbulent exchange, condensation, evaporation, convective heat transfer, conduction, rain heat); 6) snowmelt indexes (clear weather and rainy weather, application to project basin, temperature indexes); 7) areal snow cover (ablation, runoff, observation); 8) effect of snowpack character on runoff (metamorphism, heat transfer, temperature, liquid water, transmission, storage potential); 9) hydrograph synthesis; 10) design flood determination; 11) seasonal runoff forecasting, 12) reservoir regulation. The value of the work lies in its comprehensiveness, and in the amount of empirical data on each phase of the subject that is contained in the graphical form most familiar to engineers and hydrologists anywhere in the world. *Subject Headings:* **1. Snow hydrology investigations 2. Snow hydrology data 3. Handbooks 4. Cooperative snow investigations 5. Central Sierra Snow Laboratory, California 6. Willamette Basin Snow**

Laboratory, Oregon 7. Upper Columbia Snow Laboratory, Montana 8. Washington 9. Idaho.—*M.R.*

8.3–15 551.590.21(02)527.7(02)

†*Waldmeier, Max, **Ergebnisse und Probleme der Sonnenforschung.** [Results and problems of solar research.] 2d enl. ed. Leipzig, Akademische Verlagsgesellschaft, **1955.** 389 p. 146 figs., 68 tables, numerous foot-refs., eqs. **DWB**—The first edition of this highly technical and thorough book on the sun came out in 1941. The second edition is concerned with its structure, radiation, photosphere, rotation, spectra, sunspots, faculae, the chromosphere, protuberances, corona, radio radiation and terrestrial relations. The 12 chapters on the above aspects are divided into 110 sections, each dealing with a very specific subject (e.g., No. 2, The energy distribution in the solar spectrum; No. 4, The solar constant; No. 6, Variations in UV radiation; No. 28, The Boltzmann and Saha formulas; No. 52, Sunspot theories; No. 78, Protuberance theory; No. 93, Eruptive radioemissions; No. 102, Ionization in earth's atmosphere due to solar radiation; No. 103, Periodic changes in ionosphere; No. 104, Propagation of electromagnetic waves in ionosphere; No. 107, Magnetic storms; No. 109, Solar component of cosmic radiation and No. 110, Influence of solar activity on the troposphere). *Subject Headings:* **1. Solar research 2. Solar-terrestrial relations textbooks 3. Textbooks.**—*M.R.*

8.3–16 551.556.3

Barasoain, José Antionio and Fontan, Luis, **La energia del viento y su aprovechamiento.** [Wind energy and its utilization.] *Spain. Consejo Superior de Investigaciones Científicas. Comisión Nacional de Energia Eolica, Informe* EE/101, May **1955.** 41 p. 31 diagrs., 6 tables, 13 refs. **DWB**—A report on the work on the utilization of wind energy in Spain which has been conducted during the past three years by the National Commission for Wind Energy. The author discusses the wind pattern of Spain giving isolines of mean annual wind velocity and mean monthly isolines of wind velocity for Jan. and July (in m/sec) and a table giving wind observation stations in Spain with type of anemometer, duration of observations, mean annual wind velocity, etc. Also the following are considered: calculation of wind force, including a nomogram for computing the maximum usable wind energy per m^2 as a function of wind velocity; the duration of wind velocity (causes being given for various localities in Spain); the duration of wind force; estimation of energy obtainable by a wind generator and appropriate formulas, and calculations of wind energy for various points of Spain and abroad for these types of wind generators. *Subject Headings:* **1. Wind energy 2. Wind utilization 3. Wind generators 4. Spain.**—*I.L.D.*

8.3–17 551.509.34

§Bérenger, Maurice, **Essais d'étude météorologique du bassin méditerranéen.** [Attempt at a meteorological study of the Mediterranean Basin.] *France. Météorologie Nationale, Memorial,* No. 40, **1955.** 41 p. 25 figs., 7 refs. **DWB**—A monograph giving in separate chapters information on 1) the history, economics and geography of the Mediterranean Basin (with a large folded map of the region), 2) general circulation and its interrelation with the Mediterranean, 3) influence of topography and relief, seasonal effects, 4) air masses, 5) cyclonic disturbances (Gulf of Genoa, Balearic, N.W. Africa, Cyprus), 6) fronts and clouds, flying conditions (ice and turbulence), 7) visibility (fog, sand), 8) wind (surface and aloft), 9) special winds, and finally, 10) forecasting from 500 mb and surface charts. A number of actual case histories are described and illustrated in each pertinent chapter. *Subject Headings:* **1. Regional forecast studies 2. Synoptic case histories 3. Mediterranean weather 4. Mediterranean Region.**—*M.R.*

8.3–18 551.509.5

*Gringorten, Irving I.; Lund, Iver A. and Miller, Martin A., **A program to test skill in terminal forecasting.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics,* No. 80, June **1955.** 63 p. 15 figs., 13 tables, 10 refs., 17 eqs. Appendices 1 and 2. Appendices 3–6 issued in separate publication, No. 80 (Annex), June **1955.** tables. **DWB, DLC**—The present study is aimed at setting up and testing a system for determining the skill of a forecaster (not the economic value, or the scientific accuracy of the forecast) in a manner

which would make it impossible to hedge or to take advantage of persistence, climatology or favorable periods of weather. Ten years of climatic data for each of four stations were used and the tests made over a period of 2 years. Differences between stations, between individual forecasters at a station, effectiveness of forecast aids, relative difficulty in forecasting the different elements or in different times of day, seasons or individual years, and variations in skill with length of forecast interval were analyzed by means of this system. The stations used were Langley Air Force Base, Virginia (1936–52), Mitchell Field, Long Island (1937–53), Minneapolis (1939–52) and McChord Air Force Base, Washington (State) (1940–52). Detailed climatic and contemporary tables and the scoring procedures are presented for each element and each station in the appendix. The main report outlines in detail the procedures in preparing and conducting the program (choice of stations, coding, data collection, day-to-day forecasting, verification and scoring) and results of the 4 trial programs, theory, etc. *Subject Headings:* **1. Forecast verification programs 2. Forecast skill 3. Climatic data for forecast verification.**—*M.R.*

8.3–19 551.582.2(54)

*India. Meteorological Dept., **Climatological tables for observatories in India. 1953.** 543 p. 254 tables. **DAWS**—Tables contain monthly averages and frequencies, at 2 hours of the day, as follows: mean station pressure, wet-bulb temperature, relative humidity, vapor pressure, total and low cloud amount; mean and extreme temperatures; mean and 24-hour maximum precipitation, with amount in wettest and driest months; frequency of specified wind directions and speed classes, with mean speed; and mean number of days with thunder, hail, dust storm, squall, fog, total cloud amount and low cloud amount in classes (0, 1–3, 4–6, 7–9 and 10 tenths), and specified visibility classes. There is a table for each of 254 stations distributed throughout India (before partition), Burma, Ceylon, Afghanistan (1 station), Tibet (1), Arabia (3), Iran (7), and the Andaman Islands (1). Periods of record to 1940 were used. Details regarding the exposure of instruments and the surrounding terrain at each station are included. There are 14 pages of errata. *Subject Headings:* **1. Climatic data for India. 2. India.**—*R. S. Quiroz.*

8.3–20 551.594.7:551.524.4:621.396.029

†Klinker, Ludwig, **UKW-Fernempfangsbeobachtungen: ihre Bedeutung für Meteorologie und Funktechnik.** [Ultra-short wave distant reception observations: their significance for meteorology and radio technology.] *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Abhandlungen*, 4, i.e., 5(35), **1955.** 66 p. 36 figs., 3 tables, 37 refs. **DWB**—Pt. 1 "The effect of meteorological conditions upon ultra-short wave propagation over the German plain and the Baltic" covers a mathematical treatment of the theory of ultra-short-wave propagation including the influence of refraction upon the range of the ultra-short-wave-ray, field strength variations beyond the ultra-short-wave horizon, reflections from the free atmospheric inversions and scattering processes at the turbulence elements of the atmosphere; the apparatus arrangement for making measurements in specified ultra-short wave ranges in the 3-meter band and the evaluation of the propagation measurements; analysis of ultra-short-wave propagation during free inversions with advection; the relationship between nocturnal radiation ground inversion and the daily variation of ultra-short wave propagation over land, etc.; the annual variation of ultra-short wave propagation; the influence of frontal processes, of low pressure areas, lows aloft, unstable stratified cold air, upon ultrashort wave propagation; large scale weather situations and mean field strength intensity; etc. Pt. 2 deals with the climatology of ultrashort wave propagation in Central Europe. It contains statistical data for a land area of 200 sq km and a sea area of 175 sq km, data on temporal field strength intensity distribution for six ultrashort wave measurement distances 100 to 500 km apart on a basis of five months of observations, decline of field intensity with distance and daily variation of the ultrashort wave field intensity. *Subject Headings:* **1. Radio transmission ducts 2. Inversions 3. Ultrashort wave propagation.**—*I.L.D.*

8.3–21 551.510.41

*†Miller, Lewis E., **The chemistry and vertical distribution of the oxides of nitrogen in the atmosphere.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers,*

No. 39, Nov. **1954.** 135 p. 11 figs., 10 tables, 264 refs., numerous eqs. **DLC**—The important literature on the discovery, presence and photochemistry of the various oxides of nitrogen (N_2O, NO, NO_2, N_2O_3, N_2O_4, N_2O_5, NO_3 and N_2O_6) in the atmosphere is abstracted and the findings condensed in the text. The first identification of N_2O (which is present in the troposphere as a result of decomposition of organic compounds in soil and of hydrocarbons in the urban air) was made by ADEL in 1938–9, and further contributions by ADEL and others have led to a fair understanding of the world-wide distribution, the vertical gradient, the dissociation in the upper atmosphere, lifetime of molecules, curve of growth, bands at 1.15, 2.13, 3.9, 4.5, 7.8 and 8.6μ, and amount of other nitrogen oxides in upper atmosphere as determined by spectroscopy and other indirect means, etc. Progress and quantitative data are indicated in chronological or tabular form. Theory is discussed and informative abstracts given for 200 papers. *Subject Headings:* **1. Nitrogen oxides in atmosphere 2. Bibliography of atmospheric nitrogen oxides.**—*M.R.*

8.3–22 551.515.1:551.553.21(94)

Moriarty, W. W., **The synoptic behaviour of the summer low. (Pt. 1 of Large-scale effects of heating over Australia.)** *Australia. Scientific and Industrial Research Organization. Div. of Meteorological Physics, Technical Paper*, No. 7, **1955.** 31 p. 6 figs., 7 tables, 17 refs., 3 eqs. **DWB**—An investigation is being conducted into the large-scale effects of continental heating, particularly the interactions between monsoonal and general circulations, by examining the forms assumed by the Australian continental low pressure area daily during the summer, and their relationships to various other features such as solar elevation, large-scale rainfall and trade wind distribution, and upper air flow. This paper sets out the method used for dividing the various forms of the low pressure area into classes, and gives results concerning the relative frequencies of the classes themselves, their interrelation in sequence, and the pressures at the centers of the associated lows. Orographic effects probably exert a highly important and complicating influence, but on the whole the results are as might be expected from SMAGORINSKY's (1953) treatment of large-scale heat sources. There are also indications that the relative importance of the different heat transport processes (vertical circulation, eddy exchange, and horizontal advection) changes from time to time, and with latitude; and there is strong evidence of a temporary reversal in January of the expected seasonal variation of latitude and central pressure of the low. Many of the statistical results should be of some interest to forecasters in the Australian region, as giving an indication of the frequency with which various associations of phenomena are to be expected. *Subject Headings:* **1. Low pressure areas 2. Monsoon circulations 3. Australia.**—*Author's abstract.*

8.3–23 551.594.5

*Parsons, N. R. and Fenton, K. G., **Observations of the Aurora Australis, Macquarie Island, May 1950–April 1951.** *Australian National Antarctic Research Expedition*, 1947–1949, *Interim Reports*, No. 5, Jan. **1953.** 338 p. 6 refs. **DLC**—A compilation of detailed auroral observations begun on May 1, 1950 at Macquarie Island (61°S mag.; 54°29′S, 158°58′E; geog.), and made from sunset to sunrise on all nights. Changes in form, location and intensity are recorded. A clinometer was used for elevation and a small hand spectroscope for determining presence of auroras on overcast or moonlight nights or during twilight. Auroras were observed on 206 nights, or 86% of possible nights during the year. Notes include sample photographs, and a summary of observations of internal motion of rays on 21 nights during year (May 1950–April 1951), and of homogeneous arcs on the remaining nights. It is believed that these data confirm suspicion that the maximum auroral belt is nearer Macquarie Island than was believed previously (based on 1913 data—a year of minimum activity). *Subject Headings:* **1. Aurora australis data 2. Macquarie Island.**—*M.R.*

8.3–24 551.553.6(611)

*Tunis. Service Météorologique, **Climatologie de la Tunisie, Vol. 2, Vent au sol.** [Climatology of Tunis, Vol. 2, Surface wind.] Its *Etudes Météorologiques*, [unnumbered]. Jan. **1954.** 342 p. 15 charts (fold.). mostly tables. **DWB**—Extensive contingency tables are

presented for 9 stations in Tunisia for 0600, 1200 and 1800 h for each month of the year. The frequencies of winds from 16 directions, for the velocity groups 0–1, 2, 3–4, 5–6, 7–8, 9–11, 12–14, 15–17, 18–20, 21–24, 25–28 and >28 m/sec, using records for 1946–50 are given. In addition, maximum monthly speeds for each station; the frequency of winds equal to or exceeding each 1 m/sec (2–30 m/sec) from each direction; the wind energy for each month of each year (1949–53) are tabulated, and color charts (Baillie) of seasonal wind frequency at 6, 12 and 18 h and of mean wind speed for Tunis and Gabes are presented. (For vol. 1, *see* 5.4–35, April 1954, *MAB.*) *Subject Headings:* **1. Wind frequency data 2. Wind roses 3. Wind power data 4. Tunisia.**—*M.R.*

8.3–25 551.506.7(73)

*U. S. Air Force. Cambridge Research Center, **Compilations of meteorologically useful data from Project "Moby Dick."** July **1956.** 10 vol. almost entirely tables and charts. **DWB**—This enormous 10-vol. compilation of raw data obtained on about 600 controlled altitude "Moby Dick" balloon flights from Jan. 1, 1953 to June 30, 1954 contains for each flight the GMT time of each "fix," the call letters of the receiving station, altitude in thousands of feet, true bearing, probable position; and for the entire flight the date, time and place of launching, size and type of balloon, lift, weight, gross load, weather at time of launching, rate of ascent, maximum altitude and place of impact as well as a map of the U. S. showing trajectory of the balloon. An index of the flights by altitude (35–80 thousand feet), and an index by launching date is added to the text which explains the purpose of the project and the compilation; gives a description of balloons, parachutes, instruments, power and heat supply, safety systems, launching techniques, calibration, accuracy of fixes, and notes on the data sheets, maps and indexes. Of the 619 flights, 143 were launched from Tillamook, Ore., 189 from Vernalis, Calif., 199 from Edwards AFB, Calif., 44 from Sedalia, Mo., and 8 from Moody AFB in Georgia. Points of landing were widely scattered. The usual flight altitude was 50–55 thousand feet, although 4 were at 35–40 thousand, 18 from 40–45, 13 from 45–50, etc. and 14 at 75–80 thousand feet. Many agencies cooperated in this project. Plotting and assembly of data was done at Lowry AFB, Colo. (Air Weather Service) and analysis and compilation by G.R.D. of AFCRC. *Subject Headings:* **1. Constant level balloon data 2. Moby Dick flight data, 1953–4 3. Tillamook, Ore. 4. United States. I. Haas, Martin L.** (*ed.*). —*M.R.*

MANUALS

See also: **Summary report, Snow Invest.** (U. S. Corps. of Engr.), 8.3–14.

8.3–26 551.510.42(02)

†Riazanov, Vladimir Aleksandrovich, **Sanitarnaia okhrana atmosfernogo vozdukha.** [Sanitary protection of the air.] Moscow, Gosud. Izdat., **1954.** 235 p. 20 figs., 52 tables, bibliog. p. 227–231. **DLC**—A well compiled manual on the sanitary protection of atmospheric air giving a detailed picture of the present state of the problem in the Soviet Union and discussing, on the basis of latest advances, the permissable limits of air pollution and the measures to be taken in order to combat air pollution in cities and industrial centers by the State Sanitary Inspection. Pt. I of the book (2 chapters) deals with general problems of atmospheric hygiene, laws of smoke propagation in the air, and principles of hygienic standardization of atmospheric pollution. Pt. II, Air pollution by dust and its prevention includes: Ch. 3, Atmospheric dust and its properties; Ch. 4, Methods of determining the degree of air pollution by dust; Ch. 5, Fuel combustion as the main source of air pollution; Ch. 6, Other (industry) sources of air pollution; Ch. 7, Preventive measures against dust pollution. Pt. III, Air pollution by gases and vapors and its prevention, contains: Ch. 8, Air pollution with sulfur dioxide and other sulfur compounds; Ch. 10, Air pollution by other chemical substances, hydrogen chloride, carbon monoxide, and many others). The book concludes with some remarks on the State Sanitary Inspection of the air. Review by M. S. Gol'dberg in *Gigiena i Sanitariia*, Moscow, 21(9):59–60, Sept. **1956.** *Subject Headings:* **1. Atmospheric pollution control 2. U.S.S.R.**—*A.M.P.*

GENERAL GEOPHYSICS AND METEOROLOGY

IGY, WMO

IGY Whistler program 8.3–348

8.3–27 550.3:061.3

International Geophysical Year, 1957–58. U. S. National Committee, **Antarctic program.** Wash., D. C., National Academy of Sciences, National Research Council, April **1956.** 53 p. 15 plates, 10 tables. **DWB**—A full report of the past, present and future U. S. International Geophysical Year operations in the Antarctic during 1954–1959. The scientific programs in the 10 fields of activity, equipment and supplies, scientific personnel at each of the 6 planned sites (shown on map and in table), station facilities and equipment, communication, operational timetable, etc., are described and illustrated. *Subject Headings:* **1. International Geophysical Year Antarctic program 2. U. S. participation in IGY 3. Antarctica.**—*M.R.*

8.3–28 550.3:061.3

Ashford, O. M., **International Geophysical Year 1957–58, session of WMO working group.** *World Meteorological Organization, WMO Bulletin,* 5(2):46–48, April **1956.** 2 photos. **DWB**—Highlights of the working group of IGY and the establishment of an international meteorological center for IGY, under the direction of J. Van Mieghem of Belgium, are presented. The meeting was held at Geneva on March 14–17, 1956 just prior to the meeting of the WMO Executive Committee. Other delegates were P. K. Evseev of USSR, T. E. W. Schumann of S. Africa, K. Langlo and O. M. Ashford of WMO. Program for IGY has been published. Work of data center will be under a special IGY unit at Secretariat (WMO/IGY Unit), a trial period will be attempted on 1–5 Jan. 1957, when all countries will send in sample data. *Subject Headings:* **1. WMO/IGY Unit 2. IGY data center 3. International Geophysical Year, 1957–1958. I. Van Mieghem, J.**—*M.R.*

8.3–29 550.3:061.3

Coulomb, J. (*Dir. Inst. de Phys. du Globe, Univ. de Paris*), **L'Année Géophysique Internationale, 1957–1958.** [International Geophysical Year, 1957–1958.] *L'Astronomie,* Paris, 70(1):1–21, Jan. **1956.** 9 photos. **DWB**—IGY, born at Brussels, will engage 61 nations and cost 100 billion francs or more. History of 2 previous polar years, French part in them, and plans for IGY in 1957–58, especially in aeronomy (meteorology, geomagnetism, aurora, airglow, ionosphere) and other aspects of the program and the French preliminary and eventual participation in the Antarctic and Greenland and their cosmic ray observations at Tananarive are described. *Subject Headings:* **1. International Geophysical Year, 1957–1958 2. French participation in IGY.**—*M.R.*

8.3–30 551.5:550.3:061.3(71)

Godson, Warren L., **International Geophysical Year: Canadian Meteorological Program.** (In: Russell, Pamela and Ballabon, Maurice B., eds., **Informal papers in Arctic meteorology.** McGill Univ. Arctic Meteorological Group, Contract AF 19(604)-1141, Scientific Report, No. 1, Dec. 15, **1955.** p. 28–35.) **DWB**—The CSAGI recommendations for the meteorological program are reviewed in the light of Canadian possibilities. A complete program is planned for Resolute, with specialized observations at six stations near the 80°W standard meridian. Very high level rawinsondes will be attempted twice daily at Alert, Eureka, Arctic Bay, Coral Harbour, Port Harrison and Moosonee. Ozone determinations will be made at Alert, Resolute and Moosonee, as well as at Edmonton. Radiation measurements will also be improved. At Resolute and Moosonee, each component of the surface radiative energy balance will be measured—direct and diffuse solar and reflected solar radiation by Eppley pyranometers, and incoming and outgoing long-wave radiation with Gier-Dunkle radiometers. The eddy flux of energy and moisture will also be measured at Resolute, using a 100-ft tower for low-level sampling of the appropriate parameters. *Subject Headings:* **1. International Geophysical Year Program 2. International Geophysical Year meteorology program 3. Canadian participation in IGY 4. Resolute, Canada 5. Canada.**—*Author's abstract.*

8.3–31 550.3:061.3

Humphrey, Paul A. (*U. S. W. B., Wash., D. C.*), **The USNC-IGY Antarctic program.** *Weatherwise*, Boston, 8(6):135–140, 154, Dec. **1955.** 4 figs. (incl. photos). **DWB**—A review of the U. S. Antarctic program taken from the pamphlet published by the office of the Executive Secretary of the U. S. National Committee for the IGY. The United States will occupy or assist in work at >300 stations in the Arctic, Antarctic and oceanic regions, etc. Network along 80th parallel (W) from Eureka, Canada to the Antarctic and the Antarctic network are shown on charts. The author was aboard the "Atka" during its reconnaissance voyage in Jan.–Feb. 1955. Operation Deepfreeze I was conducted in 1955–6 to install a station at Little America and to supply equipment for two forward stations (at South Pole and in Marie Byrd Land). Work under direction of LAURENCE GOULD in aurora, cosmic rays, geomagnetism, glaciology, ionospheric physics, rocket exploration, seismology and gravity, and in meteorology is reviewed and equipment of each Antarctic station is listed. *Subject Headings:* **1. International Geophysical Year, 1957–1958 2. U. S. participation in IGY.**—*M.R.*

8.3–32 550.3:061.3

Kalashnikov, A. G., **Mezhdunarodnyĭ Geofizicheskiĭ God.** [The International Geophysical Year.] *Priroda*, Moscow, 44(12):1–12, Dec. **1955.** 7 refs. **DLC**—An historical survey of the gradual development during the past 80 years of the general idea of the need for synchronous studies of the earth as a whole, and of its geophysics, in particular, including a review of the work done during the first two Polar Years is followed by a detailed discussion of the scope and the program of the scientific investigations in rocket research, solar physics, meteorology, geomagnetism, aurora, nightglow, cosmic rays, ionosphere, latitude and longitude, seismology and geodesy, glaciology and oceanography, which will be carried out by scientists and expeditions of many countries during the 1957–8 International Geophysical Year. *Subject Headings:* **1. International Geophysical Year 1957–1958 2. Geophysics 3. Polar year research.**—*A.M.P.*

8.3–33 550.3:061.3

Kaplan, Joseph (*Chairman, U. S. Natl. Committee for the IGY*), **The IGY program.** *Institute of Radio Engineers, N. Y., Proceedings*, 44(6):741–743, June **1956.** **DLC**—This paper presents very briefly the nature and origin of the International Geophysical Year, and in more detail two areas of special interest: rocket studies of the upper atmosphere, and satellite studies. It brings out the scientific basis for the satellite program and the development of U. S. interest in launching a satellite for scientific observations. The present status of the program is commented on briefly. *Subject Heading:* **1. International Geophysical Year program.**—*Author's abstract.*

8.3–34 628.1

Ashford, O. M., **Water resource development.** *World Meteorological Organization, WMO Bulletin*, 4(4):139–142, Oct. **1955.** 3 photos. **DWB**—Many aspects of international water resource development are discussed in this article. Special emphasis is placed on work of WMO, its panel of experts (G. Arlery, M. Gilead, Max Kohler, E. B. Kraus, L. J. Tison and Gilbert White) set up to advise the Secretary General, the Inter-Agency meeting at Geneva, Aug. 2–4, 1955, the training program (Max Kohler went to Yugoslavia in 1953 and a Yugoslavian is now studying hydrology in Germany), and the lack of a coordinated hydrological program in most countries as compared to the meteorological activity. Likewise, there is no coordinated program of exchange of river or flood data between countries, even where international rivers are an important factor. *Subject Heading:* **1. Water resources.**—*M.R.*

8.3–35 551.5:061.3

World Meteorological Organization. First Congress, Paris, March 19–April 28, 1951, **Final Report, V. 2, Proceedings [and] V. 3, Documents.** Its *WMO*, No. 1/II.RC.1 and No. 1/III.RC.1, **1953.** 2 pieces. **DWB**—These reports contain the verbal proceedings of the first Congress which set up the mechanism for the secretariat, technical and regional commis-

sions, financial support, contributions, etc. and the terms of reference and future direction o the WMO. There were 36 plenary meetings during the 6 weeks of the session. A list o delegates from the various countries represented, and of members of other organizations of th U.N., is included. Sir NELSON JOHNSON, retiring president, opened the session, and preside throughout the Congress. Dr. REICHELDERFER was elected president for the next 3 years Vol. III contains many extensive documents representing suggestions for a World Meteoro logical Institute and other supporting papers. (For Vol. 1, Resolutions, *see* 4.3–13, Marc 1953, *MAB.*) *Subject Headings:* **1. WMO conferences 2. Conference reports.**—*M.R.*

8.3–36 551.5:621.39:061.

World Meteorological Organization. Regional Association VI (Europe). Sub-Com mission for Meteorological Transmissions, **Final report of First Meeting, Paris, Feb. 1952** 29 p.+appendices, separately numbered. diagr. (fold.). **DWB**—Details of plans an recommendations regarding radio and teletype transmissions and broadcasts in differen sections of Europe, and between Europe and other continents or ocean ships are given. Bot short and long range plans are considered. Twenty delegates attended from 13 countries *Subject Headings:* **1. WMO meetings 2. Telecommunications 3. Europe.**—*M.R.*

8.3–37 551.5:061.

World Meteorological Organization. Second Congress, Geneva, April 14–May 13, 195 **Documents.** No. 1–41, dated Oct. 13, 1954–March 9, **1955.** Each Document separatel paged. tables, Mimeog. Also: Bekeffy, Mrs. Jozsef, **Ameteorológiai Világszervezet II. Kon gresszusa.** [Second meeting of the WMO.] *Időjárás*, Budapest, 59(2):119–120, March April **1955. DWB**—A large volume containing the actual English version of document presented at the Second WMO Congress. The subjects covered range widely from budgetar to administrative matters to technical regulation and notes, charts showing which countrie use metric and which use English units for geopotential, upper air temperature, surface temp length, etc. and papers such as a report on the humid tropics, definition thereof, countrie involved, and meteorological conditions and requirements therein. The second article i mainly based on reports in the Jan. 1955 issue of the WMO Bulletin. (For its contents, *se* 6(8):1212, Aug. 1955, *MAB.*) *Subject Headings:* **1. WMO conferences 2. Document presented at WMO conferences.**—*M.R., G.T.*

8.3–38 551.5:061.

World Meteorological Organizations. Regional Association V (South-West Pacific) Working Group on Meteorological Telecommunications, **Full report of the First Session Melbourne, Jan. 23–27, 1956.** Melbourne, Bureau of Meteorology, [1956]. various pagina tions. **DWB** (MO6 W927r)—Standard WMO Commission Report: 1) List of participants 2) Agenda, 3) summary of sessions, 4) 18 conclusions. The conclusions were entirely in con nection with exchange of synoptic information, telecommunications, and allied subjects *Subject Headings:* **1. WMO Regional Association reports 2. Telecommunications reports** —*M.R.*

8.3–39 551.5:001.6

World Meteorological Organization. Regional Association VI (Europe), **Resolution and recommendations adopted since the first session, from June 8, 1952 to Dec. 31, 1954** *World Meteorological Organization, WMO*, No. 37, RP 17, **1954.** 49 p. Price: Sw. fr. 1.00 from Secretariat, Geneva. **DWB**—Most of the 64 resolutions and recommendations given i full in this publication have to do with radio and teletype communications and broadcasts i Europe and over the Atlantic, and especially with codes and specifications and exchange o data. Other resolutions deal with Payerne radiosonde trials, Commission on Hydrology ships reports, etc. *Subject Headings:* **1. WMO. Resolutions 2. Synoptic codes and speci fications. I. Lugeon, Jean.**—*M.R.*

8.3–40 551.5:061.3:6

World Meteorological Organization. Commission for Agricultural Meteorology, **Algunas resoluciones de la Comisión de Meteorología Agrícola de O.M.M. tomadas en el Congres**

le París, Reunido el 3–20, Nov. de 1953. [Some resolutions passed by the Commission . . . during the Paris meeting, Nov. 3–20, 1953.] *Revista Meteorológica*, Montevideo, 13(46):46–50, June 1954. In French. **MH-BH**—Text of Resolutions 1.1–1.5, dealing with the establishment of agrometeorological networks by WMO members, and Recommendations 17 and 18 concerning short- and long-range agricultural forecasting services to be introduced wherever they are not yet in practice. The text is taken from the minutes of the Paris conference of the WMO Commission for Agricultural Meteorology, held in Paris in Nov. 1953. *Subject Headings:* **1. WMO. Commission for Agricultural Meteorology 2. Agricultural meteorology** —*G.T.*

EXPEDITIONS—ARCTIC AND ANTARCTIC

See also: **Climate of Soviet Arctic** (Leont'eva), 8.3–11; **Climate of Antarctic** (Tauber), 8.3–12; **Antarctic program, U. S.** (IGY, 1957–58. U. S. National Committee), 8.3–27; **Arctic bibliog.** (Arctic Inst. of North America), 8.3–59.

8.3–41 656.7:91.04:551.311.17(988)

The Greenland Ice Plateau: a Quarterly Review Staff brief. *Air University Quarterly Review*, Wash., D. C., 7(4):78–90, Spring 1955. illus. (incl. photos). **DLC**—A report on the exploration of Greenland Ice Cap by successive airborne expeditions of the U. S. Air Force, begun in 1942 after the signing of the Danish-American agreement relative to defense of the island. It includes the description of three small (in regard to personnel and equipment) expeditions sent out during the war in 1942, 1943 and 1944. The results, although meager from the viewpoint of explored territory, gave some information on the problems of future explorations. The 1947 expedition, known as Project Snowman, was much better organized and equipped with B-17 and C-47 airplanes on skis (based at Soundre Stromfjord) and demonstrated the ability to use the air in reaching areas otherwise inaccessible to man and that landing and take-off could be made (by wheeled aircraft) on the unprepared snow surface of the ice cap and frozen lakes. The results of Snowman proved the possibility of constructing air bases (even semi-permanent) on the ice cap and of getting more information on the weather, the snow structure, the terrain features, the effects of warm season upon the surface. Numerous sketches and photos of the terrain and equipment are included. *Subject Headings:* **1. Airborne expeditions 2. Greenland Ice Cap 3. Greenland.**—*A.M.P.*

8.3–42 551.311.12(987)

†Baird, P. D. (*Dept. Geog., King's College, Aberdeen Univ.*), **Glaciological research in the Canadian Arctic.** *Arctic*, Ottawa, 8(2):96–108, 1955. 7 figs. (incl. photos), 36 refs. **DLC**—An outline of the discovery, research beginning about 1945, extent, growth, ablation, structure, erosive action, etc., of the glaciers on Baffin Island, Devon, North Lincoln, Ellesmere and other Islands of N.E. Canada. The theory that these glaciers are the remnants of the Wisconsin Glaciation, and the nucleus from which the Continental Glacier spread, is discussed pro and con in the light of recent studies. The relation of the glacier ice to the ice pack of the Arctic is also considered. Many photos of the main glaciers and a good bibliography are included. *Subject Headings:* **1. Glaciers of northeast Canada 2. Northeast Canada.**—*M.R.*

8.3–43 551.509(98) 551.587(98)

Hare, F. Kenneth, **Investigations in Arctic meteorology at McGill.** (In: Russell, Pamela and Ballabon, Maurice B., eds., **Informal papers in Arctic meteorology.** McGill Univ. Arctic Meteorological Group, Contract AF 19(604)-1141, Scientific Report, No. 1, Dec. 15, 1955. p. 36–40. map (fold.), 11 refs.). **DWB**—The Arctic Meteorology Research Group was set up in Sept. 1954 at McGill Univ., under GRD sponsorship. Its objectives are (1) to establish an adequate system of synoptic models for high latitude analysis, (2) to investigate statistical methods for specifying the pressure field north of 55°N, and (3) to study some aspects of the upper air climatology over the Arctic as a necessary preliminary to (1). Since Jan. 1, 1955 the Group has received daily the circumpolar chart series for M.S.L. and 500 mb from the Arctic Forecast Team, Edmonton, Alberta. Using an arbitrary rectangular sampling grid whose density is roughly equal to that of surface synoptic stations north of 60°, the Group has prepared 5-day and 30-day means for both pressure levels since Jan. 1. A modified form

of the Wadsworth-Bryan technique of specification, using Tschebyscheff (Chebyshev) orthogonal polynomials, is being applied to the daily maps and the period means. *Subject Headings:* **1. Arctic meteorology 2. Upper air climatology 3. Arctic research.**—*Author's abstract.*

8.3–44 551.311.1:91.04(99)

Giaever, John et al., **The white desert: the official account of the Norwegian-British-Swedish Antarctic Expedition.** Translated from the Norwegian by E. M. Huggard. New York, Dutton, **1955.** 256 p. 10 figs., 16 plates. **DWB**—Popular account of international expedition, under direction of SVERDRUP of Norway, AHLMANN of Sweden and WORDIE of the United Kingdom, which undertook glaciological studies in the Antarctic during 1950–1952. The area explored was from the shelf ice south of Maudheim to the ice plateau (8800 ft) 400 mi inland. *Subject Headings:* **1. Norwegian-British-Swedish Antarctic Expedition (1949–1952) 2. Glaciological expeditions 3. Popular books 4. Antarctica. I. Huggard, E. M.** (*trans.*).—*M.R.*

8.3–45 511.311.17(99)

Rybnikov, A., **Aĭsbergi Antarktiki.** [Antarctic icebergs.] *Vokrug Sveta*, Moscow, No. 1:17, Jan. **1954. DLC**—Characteristic features of Antarctic icebergs, exceeding by their number, size and longevity the northern icebergs, are described and discussed by a member of the Soviet whaling flotilla "Slava" on ground of personal observations made during the whaling season 1952 in Antarctic seas. The most frequently encountered icebergs are of the tabular type, with only $\frac{1}{5}$ of the total height rising above the sea surface. Thus, on March 8, 1952 one of the whalers observed a grounded iceberg rising 50 m above the sea near Soviet Island; the measured sea depth at that spot was 190 m. Author discusses further the manner of gradual thawing and disintegration of the icebergs, the various shapes they acquire during that period and the danger they present to ships. *Subject Headings:* **1. Antarctic icebergs 2. Icebergs 3. Antarctic.**—*A.M.P.*

SOCIETIES AND RESEARCH INSTITUTIONS

See also: **Arctic Met res. at McGill** (Hare), 8.3–43; **Astronautical activities in Germany** (Koelle), 8.3–70; **Snow and avalanche res. of the Swiss Inst. for Snow and Avalanche Research** (de Quervain), 8.3–269.

8.3–46 551.590.21 523.7

American Geophysical Union. Special Committee on Cosmic-Terrestrial Relationships, **Report of the Committee, 1954–1955.** Harlan T. Stetson, chairman. *American Geophysical Union, Transactions*, 36(6):1061–1066, Dec. **1955.** 18 refs. **DWB, DLC**—Reports by HELEN DODSON, D. H. MENZEL, E. O. HULBERT, H. W. WELLS, HERBERT RIEHL, E. M. BROOKS and S. A. KORFF cover investigations in fields of basic solar research (solar flares, etc.), solar-ionospheric relationships, radio-astronomy of sun, rocket ionospheric and UV solar spectrum studies, whistling atmospherics, cosmic rays, rainfall variations due to cosmic influences, and temperature variations with sunspot cycle. *Subject Headings:* **1. Solar-terrestrial relationships 2. Solar-atmospheric research 3. Solar physics. I. Stetson, Harlan T.**—*M.R.*

8.3–47 91:06

Pietkiewicz, S., **Odczyt prof. S. Kaleśnika o Towarzystwie Geograficznym ZSSR.** [Report of Prof S. Kalesnik on the Geographical Society of the U.S.S.R.] *Czasopismo Geograficzne*, Warsaw, 26(3):308–310, **1955.** ref. **DLC**—The report dealt with the organization and activities of the Society—the number of active members (about 6000) and affiliated societies (86) in all republics of the Union. The ruling body is the convention assembled regularly every three years. Between the conventions the activities of the society are directed by the Scientific Council. The guidance of the individual branches of geography is carried out by Commissions, some of them are permanent (physical geography, economic geography, etnography, cartography, bio-geography, geographic teaching methods and history of geography); some are temporary with smaller assignments—as the Murmansk Commission. The

basic forms of activities are: scientific meetings, meetings and conferences, review and discussion of programs and plans for teaching, scientific expeditions, information and publishing. Information is given by correspondence, both by the Central Institution and the local offices (more than a 1000 per year). *Subject Headings:* **1. Geographical Society, Leningrad 2. U.S.S.R.**—*A.M.P.*

8.3–48 551.5:91:06

Grigor'ev, A. A. and Abramov, L. S., **Puti razvitiia sovetskoĭ geografii: po itogam vtorogo s"ezda Geograficheskogo Obshchestva SSSR.** [Paths of development of Soviet geography: results of 2nd Convention of Geographical Society of the USSR.] *Priroda*, Moscow, 44(11): 47–55, Nov. **1955.** 4 photos, 2 refs. **DLC**—In this report the author lists some of the achievements of recent Soviet expeditions to the Arctic and summarizes briefly studies on drifting ice, microfauna of the Arctic, oceanographic studies off the Kurile Islands and in the Barents Sea, the ice ages in European and Asiatic Russia, radiational and heat balance of the USSR and of the globe (M. I. Budyko), moisture cycle of limited areas of earth's surface (O. A. Drozdov), evaporation from the earth's surface and the relationship of climatic melioration to agricultural production. *Subject Headings:* **1. Arctic expeditions 2. Geographical conferences 3. U.S.S.R.**—*I.L.D.*

8.3–49 551.5:06 91:06

Vtoroĭ s"ezd Geograficheskovo Obshchestva SSSR. [Second conference of the Geographical Society of the U.S.S.R.] *Meteorologiia i Gidrologiia*, Moscow, No. 3:66–67 May/June **1955. DWB**—The papers on meteorology and climatology delivered at Feb. 3–10, 1955, meeting of the Geographical Society of the USSR and their authors are mentioned. Papers on the agro-climatic resources of the USSR, on radiation and heat balance, on the moisture cycle, oceanographic research in the Arctic, on the hydrology of rivers, etc. were presented. *Subject Headings:* **1. Geographical conferences 2. Meteorological conferences 3. U.S.S.R.**—*I.L.D.*

8.3–50 551.5(378.4)

Kuvshinova, K. V., **Itogovaia sesiia uchenogo soveta Glavnoĭ Geofizicheskoĭ Observatorii im. A. I. Voeĭkova.** [The final session of the scientific council of the Central Geophysical Observatory.] *Akademiia Nauk SSSR, Ser. Geogr.*, No. 3:84–86, **1955. DLC**—Presents minutes of a final session Jan. 18–22, 1955 at which achievements and activities of the preceding year are reviewed and summarized. Besides the coworkers of the Observatory and of the Hydro-meteorological Service it was attended by representatives of various universities and institutes (Arctic, Geophysical, Geographical, Plant breeding). The most important papers read and discussed at the session were: Laĭkhtman, D. L., **Theory of transformation of air masses and its application.** Kucherov, N. V., **Modern methods of investigation of the lowest air layer.** Vorontsov, P. A., **Investigation of the temperature and wind regime of the lower 1 km thick-air layer.** Other reports concerned the radiational properties of clouds, the study of moisture exchange, etc. A new world map of the aridity index was presented. *Subject Headings:* **1. Seminars 2. Central Geophysical Observatory, Leningrad, meetings.**—*A.M.P.*

CONFERENCES

See: **Frost protection conferences** (Germany. Deutscher Wetterdienst), 8.3–1; **Ships' hold meteorology** (Hamburg. Seewetteramt), 8.3–2; **Desert biol., a symposium** (Inst. of Biol., London), 8.3–3; **IGY 1957–58 WMO group session** (Ashford), 8.3–28; **Final report, Proceedings, Documents** (WMO), 8.3–35; **First Meeting, final report** (WMO), 8.3–36; **Documents** (WMO), 8.3–37; **First Session full report** (WMO), 8.3–38; **Russian Geog. Soc., Convention** (Grigor'ev, Abramov), 8.3–48; **Russian Geog. Soc., Second conference,** 8.3–49; **Central Geophys. Obs., Scientific Council, final session** (Kushinova), 8.3–50; **Commission No. 4 on Radio Noise . . .** (Int. Sci. Radio Union), 8.3–97; **Atmos. pollution conferences** (Gol'dberg et al.), 8.3–136; **Climatic conference at Wroclaw, March 26–27, 1954** (K—), 8.3–282; **Seventh Semi-annual Meeting on Researches conducted in Laboratories** (Japan. Radio Res. Labs.), 8.3–346.

SERVICES

See also: **Water resource development** (Ashford), 8.3–34; **U.S.S.R. Geog. Soc., report** (Pietkiewicz), 8.3–47; **Domestic aviation forecasting** (Benum), 8.3–74; **Trans-oceanic aviation services** (Graham), 8.3–77; **Agromet. services, Yugoslavia** (Burgos), 8.3–80; **Organization of Agric. Met., Belgium** (Vandenplas), 8.3–85.

8.3–51 551.5:06

U. S. Weather Bureau, **Meteorological services in the United States, showing the locations and types of surface weather reporting stations operated by the U. S. Weather Bureau, the Civil Aeronautics Administration, the Air Force, Navy, and Coast Guard, and other agencies.** Its *W.B. Map*, No. 1806, Oct. 1, **1954.** 1 sheet (fold.) in color. **DWB**—Large color map showing with different symbols all types of stations and service centers in U. S. except cooperative climatological and hydrological stations. Insets of 16 major cities and their environs show services in more detail in those areas. Administrative and forecast regions as well as centers are indicated. Alaska, Hawaii, Puerto Rico, etc. are not included. *Subject Headings:* **1. U. S. Weather Bureau network map 2. Meteorological services 3. Networks.**—*M.R.*

8.3–52 551.579:0

Kejla, Jaroslav, **Krátce o vývoji a organisaci hydrometeorologické služby v SSSR.** [Summary of the development and organization of the hydrometeorological service in the USSR.] *Meteorologické Zprávy*, Prague, 5(6):151–153, **1952. DLC**—Systematic meteorological observations in Russia were started in 1722. The history of Russian meteorology since that time is outlined. The present structure of meteorological, hydrological and geophysical networks and research organizations in the Soviet Union is described and their activities indicated. The ten volumes of observers' manuals published by the GUGMS (Chief Hydrometeorological Directorate) are listed. *Subject Headings:* **1. Hydrometeorological services 2. History of meteorology 3. Bibliographies 4. U.S.S.R.**—*G.T.*

8.3–53 551.5:001.

McIntyre, D. P., **Meteorology, 2000 A.D.** *Royal Meteorological Society, Canadian Branch* [*Publications*], 6(1), Feb. 24, **1955.** 14 p. foot-refs. **DWB**—A "forecast" of possible developments which will affect meteorological service and in particular forecasting during the next 45 years. Improved communications, instrumentation (rockets, satellites, etc.), mechanized computers, specialized service and research by government, industry and universities are mentioned as contributing factors to a tremendous improvement in service rendered. Forecasts for planets are even a possible requirement by 2000 A.D. *Subject Heading:* **1. Progress in meteorology.**—*M.R.*

8.3–54 551.5:061.

Dési, Frigyes, **A meteorológiai kutatás időszerű kérdései.** [Current problems in meteorological research.] *Időjárás*, Budapest, 59(2):65–70, March/April **1955.** Russian and French summaries p. 65. **DWB**—A modern building for the Hungarian Meteorological Institute, a teletype circuit with Prague and thus indirectly with Potsdam; establishment of research stations for agricultural meteorology and for the microclimatology of Lake Balaton; participation in international conferences; extensive educational activities, etc. are mentioned as achievements in Hungarian meteorology during recent years. Service to agriculture is emphasized as the foremost objective of meteorological research. Research programs of the Hungarian Meteorological Institute in the fields of dynamic meteorology and synoptic aerology (investigation of excessive precipitation, drought, frost damage and disastrous storms as related to atmospheric circulation), long-range forecasting (polar charts are now being prepared regularly), aviation meteorology, ionospheric and electrical measurement, radiation measurement, climatology (a climatic atlas of Hungary to be published in 1955) and microclimatology are outlined. *Subject Headings:* **1. Meteorological research 2. Hungary.**—*G.T.*

EDUCATION, HISTORY AND BIOGRAPHY

BIOGRAPHY

8.3–55 551.5:92

Dover, Cedric and Bose, D. M., **Obituary [of] Sunder Lal Hora, 1896–1955.** *Science and Culture*, Calcutta, 21(8):431–435, Feb. 1956. photo. **DLC.** Also: Seshachar, B. R., **Obituary of Dr. S. L. Hora.** *Current Science*, Bangalore, 25(2):46, Feb. 1956. **DWB, DLC**—Dr. SUNDER LAL HORA, D.Sc., F.R.S.E., C.M.Z.S., F.N.I. Director of Zoological Survey of India, was born in Punjab in May 1896, educated at Gov't College, Lahore, was widely traveled and on many regional and international commissions. He published over 400 papers on many fields of zoology, ecology and paleogeography. He was a member of UNESCO Arid Zone panel, the I.U.G.G. Association of Oceanography, Central Board of Geophysics, etc. and author of Satpura Hypothesis (*see* 2.2–135 and 3.4–229, *MAB*). Died of heart attack on Dec. 8, 1955 while presiding at an Asiatic Society meeting at Calcutta where he had given a lecture. He once said "Mutual aid and cooperation are far more potent factors in the scheme of life than conflict." *Subject Headings:* **1. Obituaries 2. Satpura Hypothesis 3. Hora, S. L.**—*M.R.*

8.3–56 551.5:92

Stenz, Edward, **Antoni Bolesław Dobrowolski, 1872–1954.** [Biography.] *Przegląd Meteorologiczny i Hydrologiczny, Warsaw*, 7(1/2):3–9, **1954. DWB, DLC**—The most important facts of the life and activity of the late (died April 27, 1954) member of the Polish Academy of Sciences, former member of the Belgian Antarctic Expedition on the ship "Belgica," director of the State Meteorological Institute, prominent explorer and educator are presented in a biographical sketch and a review of his most important works. A list of his 22 publications in the field of glaciology and meteorology is added. *Subject Headings:* **1. Biography 2. Dobrowolski, Antoni Bolesław.**—*A.M.P.*

8.3–57 551.5:92

Cannegieter, H. G., **In memoriam Ewoud Van Everdingen, Feb. 26, 1873–July 17, 1955.** *Hemel en Dampkring*, The Hague, 53(10):189–191, Oct. **1955.** photo. **DLC, DWB**—The profesional career and activities in the International Meteorological Commission of VAN EVERDINGEN who was director of the Royal Netherlands Meteorological Service are outlined in the obituary. *Subject Headings:* **1. Obituaries 2. Van Everdingen, Ewoud.**—*I.L.D.*

8.3–58 551.5:92

Tillotson, Ernest, **Dr. Ernst Wanner [Obituary].** *Nature*, London, 177(4508):558, March 24, **1956. DWB**—Born Zurich, July 22, 1900, died Nov. 4, 1955. Joined Swiss Meteorological Service in 1928, working mainly on seismology and geomagnetism. He was also vice-director for personnel and President of the Swiss Committee of the I.U.G.G. *Subject Headings:* **1. Obituaries 2. Wanner, E.**—*C.E.P.B.*

BIBLIOGRAPHY

See also: **Hydromet. service, U.S.S.R.** (Kejla), 8.3–52; **Agromet. services Yugoslavia** (Burgos), 8.3–80; **Commission No. 4 on Radio Noise . . .** (Int. Sci. Radio Union), **8.3–97; Soil temperatures** (Crawford), **8.3–192.**

8.3–59 551.5(98):016

†Arctic Institute of North America, **Arctic bibliography, Vol. 6.** Prepared for and in cooperation with the Dept. of Defense under the direction of the Arctic Institute of North America. Ed. by Marie Tremaine. Wash., D. C., U. S. Govt. Print. Off., **1956.** 1208 p. map (fold.). Price: **$4.50.** 5,285 items (No. 33,126–38,410). **DLC**—The present volume of the Arctic Bibliography comprises an alphabetical arrangement (by author) of 5285 titles, making a total of 38,410 titles in the 6 vols. The subjects covered include geology, geography, zoology, physiology, engineering, aeronautics, agriculture, forestry, anthropology and sociology,

as well as meteorology and oceanography of which there are about 400 titles. The entries are annotated, and a 260 page subject and place index appended. The material is preponderantly of recent imprint; about 3800 or 75% from publications dated 1940 or later and 60% since 1950. (For abstract on first 5 vols., *see* 6A–13, Jan. 1955, *MAB*.) *Subject Headings:* **1. Arctic bibliographies 2. Arctic climatology 3. Arctic. I. Tremaine, Marie** (*ed.*) **II. U. S. Dept. of Defense.**—*M.R.*

8.3–60 681:016 551.508:016

†Brombacher, W. G.; Smith, Julian F. and Van der Pyle, Lyman M., **Guide to instrumentation literature.** *U. S. National Bureau of Standards, NBS Circular*, No. 567, Dec. 14, **1955**. 156 p. **DWB**—This guide comprises a classified and unannotated list of over 1200 references (including 660 books) to abstract and review journals, bibliographies, textbooks and technical books, dissertations, directories, guides to technical literature, indexes to technical literature, patents, periodicals and handbooks in many fields of physical science and engineering where directly or partially concerned with instrumentation. A list of 13 books on meteorological instruments (no. 3200–3212) is found on p. 48, and works on temperature, pressure, optics, cosmic rays, rocket instrumentation, air pollution, etc. in other parts of the guide. A good subject index and an author index are provided. The list of periodicals and books is quite complete for American publications but only partially complete for European. *Subject Headings:* **1. Instrument bibliographies 2. Bibliography on Meteorological instruments.**—*M.R.*

8.3–61 551.586:72:016

†National Research Council, Wash., D. C., Building Research Advisory Board, **Preliminary bibliography of housing and building in hot-humid and hot-dry climates. 1954 Supplement (Jan. through Dec. 1954).** *Texas. Univ. Bureau of Engineering Research, Special Publication*, No. 28, [**1956?**]. 160 p. **DWB**—Technical literature in the English language on various aspects of housing and building research for hot climates is reviewed and indexed in the **Preliminary Bibliography of Housing and Building in Hot-Humid and Hot-Dry Climates** (1953) and in the 1953 supplement for period Oct. 1952–Dec. 1953. The present (second) supplement contains about 900 references to literature for Jan.–Dec. 1954, as assembled from current issue of *Engineering Index, Art Index, Meteorological Abstracts, Refrigeration Abstracts, Building Science Abstracts*, etc. Subject classification begins with climatology and physiology, but pertinent material is found in other sections. (For orig. bibliog., *see* 6B–163, Feb. 1955, *MAB*; for 1953 Suppl., *see* 7B-186, Feb. 1956, *MAB*.) *Subject Headings:* **1. Bibliography on hot climate housing 2. Tropical housing bibliographies 3. Building climatology.**—*M.R.*

8.3–62 551.5:016

†France. Météorologie Nationale, **Bibliographie Météorologique Internationale, v. 8, 1940 [and] v. 11, 1943.** [International Meteorological Bibliography.] both pub. Paris, [**1955?**]. 211 and 282 p. **DWB**—These two issues fill in the only remaining gaps in the war years issues of this bibliography, making it complete from its inception in 1921/24 (as the **Bibliographie Météorologique**) through the 1952 issue (pub. with the cooperation of the World Meteorological Organization. The 1940 issue contains 478 items, and the 1943 issue 971 items, not counting duplications arising from cross referencing. (For abstract on the series, *see* 5C–65 and 6A–4, March 1954 and Jan. 1955, *MAB*.) *Subject Headings:* **1. Meteorology bibliographies 2. Bibliography on meteorology 3. U.D.C. bibliographies 4. Periodical bibliographies.**—*M.R.*

HISTORY

See also: **Hist. of Met., U.S.S.R.** (Kejla), 8.3–52.

8.3–63 551.506(09)

Havens, James H. (*Florida State Univ.*), **"First" systematic American weather observations.** *Weatherwise*, Boston, 8(5):116–117, Oct. **1955**. fig. **DWB**—The first meteorological observations in North America are attributed to JOHAN CAMPANIUS, a Swedish chaplain who accompanied Governor Printz, in 1642 to Sweden's New World Colony on Delaware Bay.

A description of the observations is given. *Subject Headings:* **1. History of meteorological observations 2. North America.**—*I.L.D.*

TERMINOLOGY

See also: **Definitions of hygrometric elements** (Vujević), 8.3–237.

8.3–64 551.5(033)

†Wadati, Kiyo-o, (*ed.*), **Kisho no Jiten.** [A meteorological dictionary.] Tokyo, Tokyodo Bk. Co., **1954.** 572 p. numerous figs. (incl. photos), tables, plates and charts, refs., p. 522–526. In Japanese. **DLC**—A very recent, and standard meteorological encyclopedia in Japan. Forty-one famous meteorologists contributed to this book which covers the whole field of meteorology. Dr. WADATA, who is director of the Japanese Government Weather Service, intends to issue a revised edition periodically. More than 1000 items are covered. Good illustrations and handy charts are given. *Subject Headings:* **1. Meteorological glossaries 2. Japanese language glossaries.**—*H. Arakawa.*

8.3–65 551.510:001.4

Wares, Gordon W. (*Ionospheric Lab., AF Cambridge Res. Center*), **Terminology of atmospheric shells.** *American Meteorological Society, Bulletin,* 34(5):221, May **1953.** diagr. **DWB.** Also in *Science,* 118(3062):283, Sept. 4, 1953. **DWB.** Translation into French: **Termes techniques relatifs aux sphères atmosphériques conventionelles.** *Annales de Géophysique,* 9(4):328, Oct./Nov. **1953. DLC.** Also his: **Terminology and nature of atmospheric shells.** *Jet Propulsion,* New York, 24(1):33–35, Jan./Feb. **1954.** diagr. **DLC**—The division of the atmosphere into 6 shells with 5 dividing surfaces (or layers) as used by the U. S. Air Force Cambridge Research Center, Geophysics Research Directorate, is illustrated by a cross section model (0–1000 km height) and the approximate boundaries shown. These are troposphere, stratosphere, chemosphere, ionosphere, mesosphere and exosphere, and the boundary layers the tropopause (11 km), stratopause, (32 km), chemopause (80 km), ionopause (400 km), and mesopause (1000 km). In the last note the various layers are described and defined, and the differences between the GRD (Gerson) and that recommended for the IUGG by S. CHAPMAN, are discussed. GERSON's "chemosphere" is identical with CHAPMAN's "mesosphere," although the same height limits are recognized by both systems (0, 11, 32, 80, 400 1000 km). The Chapman system allows for several sets of terminology depending on the quantity being discussed. *Subject Headings:* **1. Atmospheric structure 2. Terminology 3. Translations.**—*M.R.*

PRACTICAL AND APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **Light penetration in sea** (Ivanoff), 8.3–170; **Submarine daylight polarization** (Ivanoff), 8.3–171; **Ultraviolet radiation penetration, Mediterranean** (Lenoble), 8.3–176; **Use of marine obs. data in forecasting** (Yamaguchi), 8.3–187; **Atmospheric pressure changes and gas solubility** (Carritt), 8.3–201; **Wind stress on water surfaces** (Neumann), 8.3–225; **Wind-created water waves** (Schooley), 8.3–226; **Drift currents Central North Atlantic Ocean** (Stommel), 8.3–227; **Wind tides in shallow water** (U. S. Beach Erosion Board), 8.3–228; **Marine climatic oscillations** (Rodewald), 8.3–293.

8.3–66 551.465 639.2

Littlewood, Wm. H. (*U. S. Hydrographic Office, Wash., D. C.*) and Hermann, Frede (*Danmarks Fiskeri-og Havundersøgelser, Copenhagen*), **Danish oceanographic and fisheries research vessel Dana, and her post-war program.** *American Geophysical Union, Transactions,* 36(5):902–906, Oct. **1955.** 4 figs., 14 refs. **DWB, DLC**—This paper describes the origin and the present administration of the Danish Ministry of Fisheries' research vessel, *Dana.* The dimensions, the living, working and storage spaces, and the fundamental research equipment are also described. Plans of the ship are presented. The program of the *Dana* for the postwar years is briefly reported, including operations in the North Sea, the Faeroe Islands

area, the North Atlantic and Davis Strait sections, and the Greenland west coast area. Station charts of selected operations are presented in conjunction with the above. Proposed future operations are discussed. *Subject Headings:* **1. Oceanographic research 2. Fisheries research 3. Denmark.**—*Authors' abstract.*

GLACIOLOGY

See: **Glaciological research, Canadian Arctic** (Baird), 8.3–42.

ASTRONAUTICS

See also: **Protection of humans from cosmic radiation in regions outside the atmosphere** (Schaefer), 8.3–90.

8.3–67 629.19

Boni, A., **Artificial satellite, unification and mechanics (sidar-mechanics).** *Astronautica Acta*, Vienna, 1(3):120–136, **1955.** 5 figs., 12 refs., tables, 63 eqs. German and French summaries p. 120–121. **DWB**—The problem of the most suitable arrangement of a series of artificial satellites (their mass, time of revolution, direction of travel, etc.) is mathematically analyzed on the basis of analogies with satellites of the solar system. *Subject Heading:* **1. Satellite observatories.**—*G.T.*

8.3–68 551.507.351:629.19

Ehricke, Krafft A. (*General Dynamics Corp., San Diego*), **The satelloid.** *Astronautica Acta*, Vienna, 2(2):63–100, **1956.** 21 figs., table, 25 refs., 126 eqs. English, German and French summaries p. 63–64. **DWB**—A theoretical analysis of a powered, orbiting vehicle, which is designated as satelloid in distinction from the (non-powered) satellite. The operational altitude of this vehicle lies above that of an aerodynamic rocket glider and below that of a satellite, in the region between 350,000 and 450,000 ft (110–140 km) or higher, based on presently available atmospheric data. The satelloid can be useful for a variety of purposes; for instance for an extended and global exploration of the chemopause and the lower ionosphere (300,000–400,000 ft) which are too low for a satellite, but which are of importance for the descent of glider vehicles from space. Other applications discussed are the use as intermediate step toward manned space flight in the form of a test and crew-training vehicle and, finally, as a scout vehicle for the exploration of extraterrestrial atmospheres and possibly as a means for radar-mapping of the Venusian surface which is hidden from optical observation by a completely opaque atmosphere. The analysis considers the flight mechanics of the circular and the subcircular velocity satelloid, its free molecule flow aerodynamic qualities and aspects of aerodynamic heating. The main results are discussed and the operational conditions of a given satelloid are presented. In an appendix, upper and outer atmospheric data are discussed. *Subject Headings:* **1. Glider descent 2. Satellite observatories.**—*Author's abstract.*

8.3–69 551.507.351:629.19

Ehricke, Krafft A., **On the descent of winged orbital vehicles.** *Astronautica Acta*, Vienna, 1(3):137–155, **1955.** 14 figs., table, 16 refs., 13 eqs. German summary p. 137. **DWB**—The flight conditions during the descent of an orbital glider are discussed on the basis of a lift parameter, defined as ratio of lift coefficient to lifting area load. The effect of the lift parameter is studied with respect to velocity-altitude correlation, free stream Reynolds number, free stream Mach number, slip flow and continuum flow conditions, hypersonic shock wave-boundary layer interaction, stagnation temperature including dissociation, boundary layer conditions and heat transfer. The various means for dissipation of the glider energy are evaluated, and base drag, as well as drag due to lift found to be most desirable. *Subject Headings:* **1. Glider descent 2. Satellite observatories.**—*From author's abstract.*

8.3–70 629.19:06

Koelle, H. H., **Astronautical activities in Germany.** *British Interplanetary Society, London, Journal*, 14(3):121–132, May/June **1955.** 7 photos. **DLC**—The author helped found

the "Gesellschaft fur Weltraumforschung" (Society for Space Research) in Stuttgart in 1948. Local sections were founded in Hamburg, Stuttgart, Frankfurt and Nurmberg in 1950. A working group on astronautics and a publication **Ad Astra** were formed in Leipzig in 1948 and 1949, respectively but were suspended in 1950 and 1951. An astronautical research institute was founded by the author in March 1952. Exhibitions, activities and future plans or possibilities are developed in this well illustrated article. *Subject Headings:* **1. Astronautical societies 2. German astronautical research.**—*M.R.*

8.3–71 551.507.362:629.19

Lawden, D. F., **Optimum launching of a rocket into an orbit about the earth.** *Astronautica Acta*, Vienna, 1(4):185–190, **1955.** 3 figs., 29 eqs. German and French summaries p. 185. **DWB**—Equations are obtained governing the trajectory along which a rocket may be guided into a circular orbit about the Earth from a launching point on its surface with a minimum expenditure of fuel. The numerical integration of these equations is discussed. *Subject Headings:* **1. Satellite observatories 2. Rocket launching 3. Outer atmosphere.** —*G.T.*

8.3–72 551.507.362:629.19

Rosen, Milton W. (*Naval Res. Lab.*), **The influence of space flight on engineering and science.** *Washington Academy of Sciences, Wash., D. C., Journal*, 46(3):79–84, March **1956.** 12 refs., eqs. **DLC**—The historical development of rockets and theory of space flight is shown to parallel that of aviation in time, although the theory of space flight is more simple and has been established for a longer time than that of flight in the atmosphere. Paradoxically, the actual development of space flight is slower—it is now about where aviation was before Lindbergh's Atlantic flight in 1927—and the advances have been jerky, not steady as in aviation. The basis for modern developments was laid by R. H. Goddard (1919) and H. Oberth in the U.S.A. and in Germany. Possibilities and limitation are outlined, in addition to discussion of evaluation of rocketry and present uses. *Subject Headings:* **1. Rocket development 2. Astronautics.**—*M.R.*

8.3–73 551.591:629.19

Tousey, R., **The visibility of an earth satellite.** *Astronautica Acta*, Vienna, 2(2):101–112, **1956.** 4 figs., 5 tables, 8 refs., 5 eqs. English, German and French summaries, p. 101. **DWB** —The conditions for naked eye and telescopic visual observations of a white 21 inch diameter earth satellite are calculated using known values of the sky brightness, solar illumination, and visual thresholds of the eye. It is shown that the optimum position in the sky is at about zenith angle 70° in the azimuth opposite the sun. If between zenith angle 0° and 35° and at 200 miles altitude, this satellite will first be visible through 7×50 binoculars when the sun is 2° below the horizon, and will be visible to the naked eye for solar depression angles greater than 9°, so long as it is illuminated by sunlight. To see the satellite easily, and to detect it with high probability, 7×50 binoculars should be used at all times and observations not attempted unless the sun is 5 or more degrees below the horizon. *Subject Heading:* **1. Visibility of artificial satellites.**—*Author's abstract.*

AERONAUTICAL METEOROLOGY

See also: **Skill in terminal forecasting** (Gringorten), 8.3–18; **Protection of humans from . . . cosmic radiation . . .** (Schaefer), 8.3–90; **Atmos. turbulence producing bumpiness** (Pinus), 8.3–211; bibliog. on **Specialized Forecasting**, p. 372–401.

8.3–74 551.5:629.13:06

Benum, F. W. (*Continental Aviation Weather Services*), **Forecasting for domestic aviation.** *Weatherwise*, Boston, 9(2):54–55, 66, April **1956.** fig. **DWB**—A map of Canada shows the facsimile communications network which extends from coast to coast and to Yukon Territory, Resolute, Coral Harbor, etc. in the Canadian Arctic. The importance of local forecast service for aviation of all types in Canada and the major and some of the minor airlines, and the ten forecast areas and their service to pilots are outlined and described. *Subject Headings:* **1. Ca-**

nadian facsimile communication networks 2. Aeronautical meteorological services 3. Canada.—*M.R.*

8.3–75 551.5:629.13

Brief history of the Civil Air Transport Meteorology Department. *American Meteorological Society, Bulletin,* 36(9):482–483, Nov. **1955.** 3 photos. **DWB, DLC**—A description of the activities of the Meteorology Dept. which not only handles the weather needs of its own company but also provides weather service for all air carriers operating into or near Formosa. The department emphasizes job training, the application of research, in particular typhoon research, and cooperates with the Chinese Weather Bureau. *Subject Headings:* **1. Formosa Civil Air Transport Meteorology Dept. 2. Formosa.**—*I.L.D.*

8.3–76 551.591.6:629.13

Clodman, J. (*Met. Div., Canada*), **Visibility deterioration associated with operations of jet aircraft.** *American Meteorological Society, Bulletin,* 37(7):338–341, Sept. **1956.** table, 6 refs., 7 eqs. **DWB**—The operation of aircraft may modify cloud and precipitation parameters sufficiently to cause a significant deterioration of visibility at an airfield. The conditions conducive to this effect are (1) large number of aircraft operating simultaneously in the vicinity of the airfield, (2) low temperatures, (3) light winds. An incident at Goose Bay on December 4th, 1954, is discussed in the light of the above analysis. *Subject Headings:* **1. Visibility from airplanes 2. Jet aircraft operations 3. Visibility decadence.**—*Author's abstract.*

8.3–77 551.5:629.13:06

Graham, R. C. (*Trans-Oceanic Aviation Services*), **Trans-oceanic aviation services.** *Weatherwise,* Boston, 9(2):51–53, April **1956. DWB**—Trans-atlantic weather service for aviation was begun in 1937 at Botwood seaplane base in Newfoundland. At present, Gander, Dorval (Montreal), Goose Bay, Vancouver, Malton (Toronto) and Winnipeg must provide trans-oceanic reports and forecasts for flights to Europe via Ireland, Iceland and Greenland, and to Bermuda, the Orient, South Pacific, New Zealand, Mexico and South America. Only because facsimile has been introduced has such expansive service been possible. Flight forecasts for single flights are composite—that is, they represent conditions at the time the flight expects to pass a point, not at a given synoptic hour. For busy airways synoptic prognostic charts are furnished in cross-section form. At least 12,500 aircraft stopped at Gander in 1 year (1954–5) and 20,000 trans-Atlantic flights called for in-flight service there. *Subject Headings:* **1. Trans-oceanic meteorological service 2. Aeronautical meteorological service.** —*M.R.*

8.3–78 551.542:629.13

Gringorten, Irving I. (*A. F. Cambridge Res. Center*), **Conditional minimal flight paths.** *Navigation,* Los Angeles, 4(7):274–278, Sept. **1955.** 5 figs., 3 refs. **DLC, DWB**—A paper showing, with the aid of examples, charts and drawings, how the time-front method can be modified to yield the path of least flying time when the flight is subject to the conditions that its path must not cross restricted areas. *Subject Heading:* **1. Minimum flight patterns.**—*A.M.P.*

8.3–79 551.551:656.71

Saha, K. R. (*Indian Air Force Station, Ambala*), **Vertical diffusion of horizontal momentum by turbulence in the lower atmosphere.** *Indian Journal of Meteorology and Geophysics,* Delhi, 7(2):147–152, April **1956.** 5 figs., 8 refs., 4 eqs. **DWB, DLC**—The effect of stability on the variation of wind with height and examples of the diurnal variation of vertical wind structure in relation to lapse rate, the vertical diffusion of momentum and the onset of turbulence at the ground, and, finally, the importance of studies of momentum diffusion for aviation are discussed and illustrated graphically from data for Ambala Airport (supplemented by radiosonde data for Delhi, 120 mi south). It is shown that westerly momentum diffuses downward during the daytime, resulting in either (a) a complete shift of wind from easterly

to westerly, or (b) an increase in westerly wind at the surface. In both cases turbulence increases markedly at the surface. *Subject Headings:* **1. Momentum diffusion downward 2. Turbulence at airports 3. Ambala Airport, India.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Agric. ecology** (Azzi), 8.3–5; **Resolutions passed by Agromet. Commission . . .** (WMO), 8.3–40; **Evaluation of grain combines on basis of meteorological data on cultivated land** (Protserov), 8.3–236; **Soil and water losses in Southwest Arkansas . . .** (Bartholomew et al.), 8.3–275; **Rainfall penetration through crops** (Yokota), 8.3–264; **Agricultural monograph, Lake Leopold II. District** (Robert), 8.3–290; **Agricultural study of the Cunene Valley,** (Agronomia Angolana, Luanda), 8.3–291; **Rice paddy micrometeorology** (Kaneseki), 8.3–299; **Arid lands** (Dickson), 8.3–301; (Giacobbe), 8.3–302; (Kassas), 8.3–303; **Field growth studies** (Glenday), 8.3–304; **Plants and climate** (Prokof'ev), 8.3–310; **Effect of met. factors on Apnytis Lingnanensis** (De Bach et al.), 8.3–311; bibliog. on **Specialized Forecasting,** p. 372–401.

8.3–80 551.5:63:06:016

†Burgos, Juan Jacinto, **Agrometeorological services in Yugoslavia.** *United Nations, Technical Assistance Programme, TAA* 173/65/06, (*Report No. TAA/YUG/8*), June 16, **1955.** 25 p. "Prepared for the Govt. of Yugoslavia, in cooperation with the World Meteorological Organization." **DWB**—The author spent about 6 weeks in Yugoslavia (Sept. 16–Oct. 26, 1953), of which the first 3 weeks were used in getting acquainted with the organization and visiting the regional centers at Zagreb, Ljubljana and a score of other places in the various republics. Lectures were given at 3 universities and a training course given for 15 days, 4 hours a day at Belgrade. Reforestation and diversified farming are two important aspects of the agricultural-forestry problem emphasized as worthy of long-term efforts. Several ways exist in which agrometeorology can contribute to the development of Yugoslav agriculture, such as by making bioclimatic or homoclimatic maps, physical studies of climate and plant growth, forecasting for pests and disease control, etc. An outline of services, organizations, recommendations for improvement of agrometeorological service and a good recommendation bibliography are included. *Subject Headings:* **1. Technical assistance missions 2. Agrometeorological services 3. Agricultural meteorology bibliographies 4. Yugoslavia.**—*M.R.*

8.3–81 632.9:551.586(85) 551.524.36(85)

*Bazan de Segura, Consuelo, **Las condiciones ambientales y las enfermedades de las plantas.** [Ambient conditions and plant diseases.] *Revista Meteorológica del Perú,* Lima, 1(1):26–28, Dec. **1954.** table. **Pt. 2.** *Ibid.,* 2(2):56–59, Jan./March **1956.** graph, 4 refs. **DWB**—Three plant diseases common in Peru (blast of rice, potato blight and powdery mildew of cotton) and meteorological conditions favoring their propagation are described. Monthly mean maximum and minimum temperatures are tabulated for Bebedero (Zana) for 1952 and 1953, and discussed in connection with the blast of rice during those years. Average maximum, mean and minimum values of temperature and humidity are also presented for an agricultural experiment station in Lambayeque (1950–1954). *Subject Headings:* **1. Plant diseases 2. Bioclimatology 3. Temperature variations 4. Bebedero, Peru.**—*G.T.*

8.3–82 551.506.8:634.8

Berényi, Dénes and Justyák, János, **Fenológiai felvételezés hegyvidéki szőlőállományban.** [Phenological survey of a mountain vineyard.] *Időjárás,* Budapest, 60(2):104–111, March/April **1956.** 5 figs., 6 tables, 5 refs. Russian and French summaries p. 104. **DLC**—At two points in Tokaj-Hegyalja the relation between the blooming intensity of grapevine, and altitude, inclination and orientation of the slope were determined by a method of regional survey developed by the authors. The zone of favorably situated slopes could be definitely determined with the help of blooming percentage. Differences resulting from agronomical or other factors can also be identified by a mathematical-statistical evaluation of the data. Such a statistical evaluation may serve as a useful guide to microclimatological research in the vineyard. *Subject Headings:* **1. Vineyard phenology 2. Slope microclimatology 3. Vineyards 4. Tokaj-Hogyalja, Hungary.**—*Trans. of authors' abstract.*

8.3–83 631.95:581.1

Chirkov, IU. I., **Primenenie na agrometeostantsiiakh metoda opredeleniia zhiznesposobnosti ozimykh kul'tur po sostoianiiu konusa narastaniia.** [A method used at agrometeorological stations to determine the viability of winter crops by observing the growing tip.] *Meteorologiia i Gidrologiia*, Leningrad, No. 5:47–48, Sept./Oct. 1955. **DWB, DLC**—In living plants the growing tip was found to be in a state of turgor, bright green in color and transparent while in dead plants turgor is completely absent and the colors are dull and brown. The method of selecting field samples, preparation of the plants and then microscopic examination and the results of its application are described. *Subject Headings:* **1. Crop ecology 2. Plant physiology.**—*I.L.D.*

8.3–84 551.5:634.11

†Stenz, Sigwart, **Über den Einfluss von Witterung und meteorologischen Grössen auf die Ertragsleistung von Obstgehölzen.** [On the influence of weather and meteorological values on orchard yields.] *Leipzig. Karl-Marx-Universität. Institut für Meteorologie, Veröffentlichungen*, 1(2):73–114, 1955. 7 figs., 5 tables, 43 refs. **DWB**—On the basis of a series of observations comprising 11 years (Naumburg a.S.) correlations between atmospheric temperature and precipitation and the yield of several varieties of apple trees are investigated. The following factors are found to contribute to high apple yield: warm temperature in the spring (especially April) of the preceding year; large precipitation amount in April/June of the current year and small precipitation amount in June/July of the previous year. In addition to discussing this investigation the author reviews earlier literature on orchard yield as affected by meteorological factors such as temperature, precipitation (rain, snow, hail, fog, dew), humidity, wind and illumination. *Subject Headings:* **1. Agricultural meteorology 2. Crop yield 3. Apple orchards 4. Naumburg a.S., Germany.**—*G.T.*

8.3–85 551.5:63:061(493)

Vandenplas, A., **Sur l'organisation de la météorologie agricole en Belgique.** [Organization of agricultural meteorology in Belgium.] *Belgium. Institut Royal Météorologique, Contributions*, No. 19, 1955. 13 p. 3 refs. **DWB**—The author discusses briefly the relationships between microclimate and agricultural meteorology, outlines the structure of the WMO and in particular the duties of the Commission on Agricultural Meteorology and describes in detail the activities of the Royal Institute of Meteorology in the field of agricultural meteorology. The work includes research in microclimatology, meteorological forecasting (crop disease, atmospheric conditions, frost, etc.), studies of meteorological requirements of plants, classification of agricultural climates, etc. *Subject Headings:* **1. Agrometeorological services 2. Belgium 3. WMO. Commission for Agricultural Meteorology.**—*I.L.D.*

FOREST METEOROLOGY

See: **Air currents on trees in Harrachovsko, Krkonos Mountains** (Vulterin), 8.3–213; **Wind conditions and tree distortions** (Křivský), 8.3–224; **Meteorological factors on parasite of California red scale** (De Bach et al.), 8.3–311; **Weather and climate in forest entomology** (Wellington), 8.3–312.

INDUSTRIAL AND MEDICAL METEOROLOGY

See also: **Ships' hold meteorology** (Hamburg. Seewetteramt), 8.3–2; **Wind energy utilization** (Barasoain), 8.3–16; **Sanitary protection of air** (Riazanov), 8.3–26; **Air pollution of industrial cities with 3–4 benzopyrene** (Dikun et al.), 8.3–134; **All-Union conf. on air hygiene and med. bacteriol.** (Gol'dberg et al), 8.3–136; **Bacterial air contamination** (Zubarev), 8.3–141; **Hygienic characteristics of UV radiation, Kiev** (Iatsula), 8.3–175; **Soil temp. studies** (Legget), 8.3–193; **Mortality from fog, London, Jan. 1956** (Logan), 8.3–254; **Human ecology, hot tropical regions** (Brunt), 8.3–306; **Cultural fungus spores, Havana, Cuba** (Cadrecha Alvarez, Fernandez Castro), 8.3–307; **Climatological micro-observations** (Veinberg), 8.3–309; **Researches conducted in Laboratories** (Japan. Radio Res. Labs.), 8.3–346.

8.3–86 551.510.42:628.53

Hewson, E. W. (*Ann Arbor, Mich.*), **Stack heights required to minimize ground concentrations.** *American Society of Mechanical Engineers, Transactions*, 77(7):1163–1172,

Oct. 1955. 11 figs., 15 refs., 6 foot-refs., eqs. **DLC**—Aerodynamic and meteorological concepts are combined in a procedure for estimating ground concentrations of effluents from stacks with various possible heights and exit gas velocities. The operation of each of the several influences at work is first described. A detailed example is then given of how the most important phases were integrated into a consistent procedure for predicting ground concentrations in answer to a specific design problem. Further improvements and refinements of the method are desirable and are being incorporated in a later study. *Subject Headings:* **1. Stack effluents 2. Stack heights.**—*Author's abstract.*

8.3–87 551.501.4:551.547:628.84

Vinson, Neal L., **Design corrections for altitude.** *Air Conditioning, Heating and Ventilating*, N. Y., 52(2):91–96, Feb. 1955. 4 figs., 5 tables. **DWB**—Corrections to apply to tables or nomograms based on sea level pressures, to obtain accurate values of specific volume of dry air, relation of velocity and weight of air flowing per square foot of face area, relation of pressure to altitude, specific humidity, etc. for plotting saturation curves on psychrometric charts at high altitudes (22, 24, 25 and 26 in. pressure corresponding roughly to 8300, 6000, 38,000 and 1800 ft elevation, respectively) are given on charts and tables and discussed with numerical examples worked out. *Subject Headings:* **1. Altitude effects on air conditioning design 2. Pressure-humidity correction tables 3. Heating and ventilating tables.**—*M.R.*

8.3–88 551.586:612.014.43

Buettner, Konrad, **Human bioclimatology and energy in arid and humid tropical zones.** (In: Mid-Southwest Conference on Tropical Housing and Building, Austin, Texas, April 1952, **Proceedings.** Austin, [1952?]. p. 37–48. 26 refs.) **DWB**—The author presents a qualitative discussion of the physical and physiological aspects of the internal balance of man, illnesses caused by exposure to heat, definition of a climate that is tropical with respect to man, importance of air movement in tropical zones, and human energy in tropical climates. *Subject Headings:* **1. Heat tolerance 2. Heat effects on man 3. Tropical climates.**—*I.L.D.*

8.3–89 551.521.64:59

†Giordano, Antonio, **Effetti biologici dei raggi cosmici.** [Biological effects of cosmic rays.] *Geofisica e Meteorologia*, Genoa, 3(3):91–95, May/June 1955. 57 refs. **DWB**—The physical properties of cosmic radiation are outlined and the results of studies on the effects of primary cosmic radiation upon animals exposed at very high altitudes and the biological effects of secondary cosmic radiations, including changes in the gonads, carcinogenic and genetic effects and effects upon growth, weight and viability are reviewed. *Subject Headings:* **1. Cosmic ray effects 2. Animal ecology.**—*I.L.D.*

8.3–90 551.521.64:523.16:613.693

Schaefer, H. J., **Protection of humans from heavy nuclei of cosmic radiation in regions outside the atmosphere.** *Astronautica Acta*, Vienna, 1(2):100–109, 1955. 3 figs., 2 tables, 7 refs. German and French summaries p. 100–101. **DWB**—Dense ionization columns which heavy nuclei of the primary cosmic radiation produce in living tissue can cause severe local cellular damage. The specifically harmful part of a heavy nucleus track is its terminal section. Therefore incomplete shielding can worsen the conditions by moving up the most effective part of an incoming beam into the body to be protected. The relationships involved are presented in graphs. It is shown that the weight requirements for full protection are prohibitively high. Due to the influence of the geomagnetic field the spectral composition of the cosmic radiation changes greatly with latitude. The exposure hazard thus can be expected to be considerably higher in the polar region than in the equatorial belt. *Subject Headings:* **1. Cosmic radiation hazard 2. Space medicine.**—*From author's abstract.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Altitude design corrections** (Vinson), 8.3–87; **Obs. of ionospheric drifts . . . with spaced radio receivers** (Yerg), 8.3–230.

8.3–91 551.501.6:551.577.37:519.241.1(773)

American Society of Civil Engineers. Sanitary Engineering Research Committee, **Variation of point rainfall with distance.** *American Society of Civil Engineers, N. Y., Proceedings, Vol.* 82, *Journal of the Sanitary Engineering Div.*, Feb. **1956.** Paper 888. 9 p. 3 figs., 2 tables. **DWB**—The variation of point rainfall with distance was studied, using data from a 50-gage network within a 100-sq mi area in Central Illinois. Two regression equations were derived, relating standard deviation to: (1) point rainfall and distance from the point of observations; and, (2) to point rainfall, distance, storm duration, average storm rainfall rate, and maximum storm rainfall rate. Multiple correlation coefficients were also determined between the standard deviation and several combinations of the five independent variables. Results indicate that regression system (1) above is most practical for prediction purposes, since relatively small improvement in efficiency was found with more complex combination of independent variables. *Subject Headings:* **1. Rainstorm charting 2. Regression equations 3. Illinois.**—*Author's abstract.*

8.3–92 551.501.7:551.507.321.2:551.557

Arnold, A. (*Signal Corps Engineering Lab., Fort Monmouth, N. J.*), **Representative winds aloft.** *American Meteorological Society, Bulletin*, 37(1):27–30, Jan. **1956.** table, 6 refs. **DWB, DLC**—A study to determine the errors to be assigned to balloon-measured winds when they are used in place of desired large-scale values. The basic response characteristics of balloons to wind and an experiment to determine the error inherent in a single balloon measurement with ten balloon flights are discussed. The pairs of observations summarized are: two balloons released from opposite ends of the 4.7 km base line, two balloons released simultaneously at arm's length apart, variations of wind with time and distance (Meteorological Office Great Britain), etc. The vertical nature of the data, instrumental accuracy, variations with height, amount of data and geographic variations are discussed. A table giving standard deviations of a balloon-measured wind from a wind of scale K is presented. *Subject Headings:* **1. Upper air wind measurement 2. Pilot balloon accuracy.**—*I.L.D.*

8.3–93 551.501.7:551.547.3

Berkofsky, Louis (*Air Force Cambridge Res. Center*) and Seager, George B., Jr., (*Air Weather Service*), **Forecast height changes at various levels computed from the thermotropic model.** *American Meteorological Society, Bulletin*, 37(5):218–223, May **1956.** 17 figs., 2 tables, ref., 13 eqs. **DWB**—It is shown how to compute forecast height changes at other levels, given those at 500 mb and 1000 mb, as computed from the thermotropic model. Since this model is vertically integrated, solutions need only be obtained for 500 mb and 1000 mb flow, in order to compute changes at any other pressure levels. The promising results obtained thus far indicate that such a scheme may have important computational advantages over those in which equations have to be solved at a number of levels to obtain forecasts at those levels. *Subject Heading:* **1. Height tendency computation.**—*Authors' abstract.*

8.3–94 551.501.7:551.507.362:77

†Holliday, Clyde T. (*Johns Hopkins Univ.*), **The earth as seen from outside the atmosphere.** (In: Kuiper, Gerard P. *(ed.)*, **The earth as a planet.** Chicago. Univ. of Chicago Press, **1954.** p. 713–725. 8 figs. (incl. photos), 14 refs.) **DLC**—The first successful aerial photographs were made in 1856 by M. NADAR from a captive balloon over Paris. In Oct. 1946 the earth was first photographed from a height that gave a clear picture of the earth as it would look from outside the atmosphere (V-2, No. 13 at White Sands, N. Mex.). Purpose of high altitude photography is to determine orientation of the rocket in flight to obtain meteorological and astrophysical data, and to conduct photographic reconnaissance. Usually 16 or 35 mm movie cameras or 10×12.7 cm aerial reconnaissance camera are used. Over 1000 successful photos

have been obtained (96% recovery of cameras and 98% satisfactory film). Meteorologists can derive useful information on climatic or seasonal changes in earth's cover, cloud formations on a large scale, orographic effects on cloudiness, cloud streets, albedo, etc. *Subject Headings:* **1. Rocket photography 2. Aerial photography 3. Rocket photo-reconnaissance 4. Earth photography from outer atmosphere.**—*M.R.*

8.3–95 551.501.83

Crary, J. H.; Helliwell, R. A. (*both, Stanford Univ.*) and Chase, R. F. (*Boeing Airplane Co., Seattle, Wash.*), **Stanford-Seattle whistler observations.** *Journal of Geophysical Research, Wash., D. C.*, 61(1):35–44, March **1956.** 6 figs., 4 refs., 4 eqs. **DLC**—Simultaneous observations of times of occurrence of whistlers were made at Seattle, Washington, and Stanford, California, two hours every week from October 1951 to October 1952. Times were measured to an accuracy of about ±1 second. The objective was to determine the percentage of whistlers received at either station which were coincident at both. A total of 318 whistlers was received at Stanford and 283 at Seattle during simultaneous observations. The occurrence rate of whistlers (during a two-hour period) varied from 0 to roughly 55 per hour at Stanford and from 0 to 70 per hour at Seattle. The correlation between the occurrence rates was poor. The number of true coincidences was found by subtracting the number of chance coincidences from the number of total coincidences. A method for computing the number of chance coincidences from a knowledge of the time intervals between whistlers at the one station was derived. The analysis showed that approximately 22 per cent were observed simultaneously at both stations. This result is examined in relation to possible theories of whistler origin and propagation, and is shown to support the Storey-Eckersley theory. *Subject Headings:* **1. Sferics frequencies 2. Whistlers.**—*Authors' abstract.*

8.3–96 551.501.83:551.594.6

Horner, F. (*D.S.I.R., Radio Research Station, Slough*), **The reception of atmospherics at high frequencies.** *Journal of Atmospheric and Terrestrial Physics*, London, 4(3):129–140, **1953.** 10 figs., 2 refs. **DWB**—Observation of the amplitudes of atmospherics received in the high frequency band offers a possible method of assessing the distances of their sources. In a preliminary investigation of the potentialities of the technique, atmospherics have been recorded simultaneously at two frequencies in the upper part of the h.f. band. Reception would be expected at both frequencies from sources within ground-wave range (about 100 km). At rather greater distances, such that the receiving point is in the skip zone for both frequencies, no reception should be possible. There should then be a zone from which there should be reception on the lower frequency only, and at greater distances energy should again be received at both frequencies. The preliminary results conform generally with this pattern, and the boundaries of the various zones are in agreement with the ionospheric data derived from vertical incidence soundings. The sources of the atmospherics observed were located by use of the network of direction finders operated by the Meteorological Office. It is concluded that the technique forms a basis for routine estimation of the distances of storms and merits further examination to determine more precisely the accuracy which can be achieved and to overcome certain practical difficulties in the observations. *Subject Headings:* **1. Sferics reception 2. Sferics sources.**—*Author's abstract.*

8.3–97 551.501.83:06:016

†International Scientific Radio Union, 11th Assembly, The Hague, Aug. 23–Sept. 2, 1954, **Proceedings, Vol. 10, Pt. 4, Commission No. 4 on Radio Noise of Terrestrial Origin.** pub. **1955.** 60 p. refs. **DWB**—In addition to minutes of the several sessions, a number of reports concerning observations of sferics in Australia, Canada, France, Germany, Great Britain, Japan, Sweden, Switzerland and the U.S.A. by chairmen of the National Committee of those countries (including A. Ehmert, F. Horner, A. Kimpara, H. Norinder, J. Lugeon and H. Dickson) are included in these Proceedings. Reference to numerous papers on atmospherics, including meteorological aspects as well as recording and radio aspects, are presented by most countries. Resolutions with respect to preparation of revised sferics charts, study of waveforms, IGY program, etc. are appended. *Subject Headings:* **1. Sferics conferences 2. Sferics bibliographies.**—*M.R.*

8.3–98 551.501.83:551.509.31:551.515.4

Perlat, A., **Comparison et utilisation des méthodes de repérage des foyers orageux.** [Comparison and utilization of methods of locating thunderstorm centers.] *La Météorologie*, Paris, Ser. 4, No. 39:211–234, July/Sept. **1955.** 11 figs., tables. English and Spanish summaries p. 211. **DWB**—The properties of lightning strokes and resulting forms of sferics, and methods and equipment for sferics observation are reviewed. Radiogoniometric thunderstorm location networks operating in Britain, France (including North Africa) and Switzerland are described, locations of their stations are shown on charts and samples of their results presented. Applications of sferics location in synoptic analysis and in thunderstorm climatology (thunderstorm distribution and frequency variations) are discussed and shown in examples. *Subject Headings:* **1. Sferics location 2. Synoptic analysis 3. Thunderstorm distribution.**—*G.T.*

OBSERVATIONAL DATA

See also: **Meteorologically useful data, Project "Moby Dick"** (U. S. Air Force), 8.3–25; **"First" systematic American weather observations** (Havens), 8.3–63; **Phenological survey, mountain vineyard** (Berényi), 8.3–82; **Radioactivity in atmosphere** (Wilkening), 8.3–331; *see also* **Routine Data Publications,** p. 404.

8.3–99 551.506:551.584.33

*Galakhov, N. N., **Mikroklimaticheskie nabliudeniia v raĭonakh srednego Priangar'ia i basseĭna verkhneĭ Leny.** [Microclimatic observations in regions of the middle Angara River and the upper Lena River Basin.] *Akademiia Nauk SSSR. Institut Geografii, Trudy*, No. 64:173–191, **1955.** 11 figs., 4 tables, 15 refs. **DLC**—This detailed microclimatic study of the central Angara and of the upper Lena basins in Irkutsk Oblast is based upon data collected over a period of ten years by various pedological and botanical expeditions. Tables, graphs and diagrams present data on the maximum, minimum and absolute air temperatures at different points, daily variations of temperature upon soil surface under different conditions of relief, duration of frost free periods, soil temperatures at a depth of 10 cm, minimum air temperatures at the leaf surface of potatoes, influence of rivers upon the appearance of last autumn and first winter fronts and on the duration of the frost-free period, profiles of the microclimatic survey of the left bank of the Oka River and right and left bank of the Lena River, etc., gradient of meteorological elements (wind velocity, air moisture, air temperature, minimum temperature at soil surface) on a given day, etc. *Subject Headings:* **1. Microclimatological observations 2. Climatic data 3. Angara River Basin 4. Lena River Basin.** —*I.L.D.*

8.3–100 551.506:551.524.36

Kyriazopoulos, Basil D. (*Thessaloniki Univ.*), **Degree of wintriness.** *Thessalonike. Panepistēmion. Ergastērion Meteōrolias, Meteorologika*, No. 3, **1954.** 15 p. 2 figs., 4 tables, 6 refs. At head of t-p: Publications of the Meteorological Institute of the University of Thessalonki. **DWB**—The concept "degree of wintriness" is defined as the sum total of the sum of minimum daily temperatures $<0°C$, $\leq -4°C$ and $\leq +4°C$ and the sum of water vapor condensations, which is the number of days with average cloudiness $\geq 8/10$, rain days >0.0 mm and twice the number of days with snow covered ground. The characteristics of the winters in Thessaloniki are analyzed by means of this factor. Tables give the degrees of wintriness for 45 years and classification of winters according to degree of wintriness. The characteristics of winters and their classification are discussed. *Subject Headings:* **1. Winter weather classification 2. Wintriness 3. Thessaloniki, Greece.**—*I.L.D.*

8.3–101 551.506:551.524(438)

*Milata, Władysław, **Temperatura powietrza w Krakowie.** [Air temperature in Kraków.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 8(3/4):199–209, **1955.** 3 figs., 16 tables, 14 refs. English summary p. 209. **DWB, DLC**—Temperature data for Kraków during 86 consecutive years (1864–1949) are analyzed in detail to determine the characteristic features of the local thermal regime and its variations. Numerous tables and graphs showing the

actual mean monthly air temperature for the period; the mean seasonal temperatures; the maximum and minimum temperatures; the number of hot and frosty days, etc. are included and analyzed. The author comes to the conclusion that the local climate undergoes a slow process of warming up attributed to the development of the city and the general tendency of the local climate to become more continental. A continuous lowering of winter mean temperature and increase of summer mean temperature has been noted during the last 60 years. *Subject Headings:* **1. Temperature data 2. Temperature trends 3. Kraków, Poland.**—*A.M.P.*

8.3–102 551.506.1:551.58(497.1)

*Zagreb. Sveučilište. Geofizički Institut. Opservatorij Grič, **Meteorološki izvještaj.** [Meteorological bulletin.] 1953 and 1954, both pub. **1955.** about 10 p. each. Entirely tables. Captions in Croatian and English.—Contains climatological data for Grič (Zagreb) Observatory, Yugoslavia (45°49′N, 15°59′E; el.: 160 m). The values covered are: hourly means of pressure, temperature, humidity, cloudiness and wind speed for each month, hourly precipitation totals, numbers of hours with precipitation, sunshine duration, number of hours with sunshine, 2-hour sums of radiation (obtained with an actinograph) and monthly wind frequencies. Means, extremes and departures are also listed. *Subject Headings:* **1. Observational data 2. Monthly climatic summaries 3. Grič Observatory, Zagreb 4. Zagreb, Yugoslovia.**—*G.T.*

8.3–103 551.506.1(676)

*Zanzibar. (*Meteorological Service*), **Summary of Meteorological Observations, 1891?–.** Latest issue, [1950?] "Observations first pub. 1891." Excerpted from Annual Report of the Colonial Government. From 1940– issued by East Africa High Commission. Meteorological Service. Title varies: 1922–1938 as **Meteorological Observations, Zanzibar Sultanate;** 1940–1943? as **Summary of Meteorological Observations in Kenya (Zanzibar Section)** by East Africa High Commission. Met. Service. 1944– **Summary of Meteorological Observations in Zanzibar,** by East Africa High Commission. . . . **DWB** 1922–1936; 1946–1950. **NNA** 1922–. **MH-BH** 1937–39, 1947; also (Town Station) 1922–1936; (Chukwani Palace), May 1931–April 1932.—Data for Zanzibar include usual monthly and annual mean (8:30 and 14:30) pressure, temperature, dew point, vapor pressure, saturation deficit, relative humidity, cloud amount, cloud amount frequency (at 8:30), rainfall, weather, wind direction and speed frequency, mean wind speed (8:30 and 14:30) and visibility frequencies for Chukwani, Victoria Gardens; Mwera; Kizimbani; and Wete, Pemba, all about 5° to 6°S; 39° to 40°E and 18 to 220 ft elevation. *Subject Headings:* **1. Climatic data 2. Annual meteorological data summaries 3. Zanzibar.**—*M.R.*

8.3–104 551.506.1(431)

*Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, **Deutsches Meteorologisches Jahrbuch, 1953, Teil 4, Heft 1, Beobachtungen des Meteorologischen Hauptobservatoriums Potsdam. Im Anhang, Beobachtungsergebnisse der Strahlungsforschungsstelle Gotha.** [German Meteorological Yearbook, 1953, Vol. 4, Pt. 1, Observations at the Potsdam Meteorological Observatory, with results of observations at the Gotha Radiation Research Station.] Berlin, Akademie Verlag, **1955.** 170 p. almost entirely tables. **DWB**—Observations at 1, 7, 13 and 19, and at 7, 14 and 21 h made at Potsdam Observatory are set forth in detail for the year 1953. Records from automatic registering instruments for pressure, temperature, vapor pressure, relative humidity, wind direction and speed, precipitation and sunshine duration; bi-hourly clouds, 6-hourly soil temperature to 50 cm, daily evaporation, and water content of snow, direct solar radiation intensity, hourly heat of solar and of sun and sky radiation, potential gradient, plus annual means and monthly means of solar radiation data; solar and global radiation and polarization of sky light for Gotha (50°57′N, 10°41′E, 356 m.H.). (For other issues, *see* 4.5–38, May 1953 and 7.10–72, Oct. 1956, *MAB.*) *Subject Headings:* **1. Annual meteorological data summaries 2. Soil temperature data 3. Solar radiation data 4. Evaporation data 5. Sky light polarization data 6. Potsdam, Germany 7. Gotha, Germany.**—*M.R.*

INSTRUMENT CARRIERS

See also: **Satelloid** (Ehricke), 8.3–68; **Winged orbital vehicles** (Ehriche), 8.3–69; **Launching rocket into orbit about earth** (Lawden), 8.3–71; **Influence of space flight on engineering and science** (Rosen), 8.3–72; **Earth as seen from outside the atmos.** (Holliday), 8.3–94; **Solar x-ray spectrum and density of upper atmos.** (Byram), 8.3–148; **Small scale atmos. motion, study** (Landers), 8.3–150; **Geostrophic altimetry** (Cook Res. Lab.), 8.3–206.

8.3–105 551.507.1:551.584

Superior, William J., **The mobile micrometeorological station.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(2):300–306, **1954.** 4 figs. **DWB**—Cross section and wire diagram show interior arrangement of a micrometeorological station located in a 15 ft house trailer. Automatic recording of wind, air and soil temperature, dew point and radiation is provided. Convenient mast assemblies for micrometeorological profiles can be carried in the trailer. *Subject Headings:* **1. Mobile micrometeorological stations 2. Micrometeorological measurements.**—*A.A.*

8.3–106 551.507.321.2:551.594.21

Balloon launchings July 5 at Orlando Air Force Base in Florida. *Science*, 122(3163):279, Aug. 12, **1955. DLC**—Brief note reporting balloon-borne measurements of thunderstorm electricity undertaken at Orlando Air Force Base, Florida, under the sponsorship of Air Force Geophysics Research Directorate. The investigation comprised measurement of electric charges in thunderclouds and the effect of lightning discharges on the earth's electric field (measured from mobile trucks). Results are not indicated in this note. *Subject Headings:* **1. Thunderstorm electricity 2. Sounding balloons 3. Orlando, Florida.**—*G.T.*

8.3–107 551.507.321:551.521.1

Edwards, Howard D.; Goddard, A., Jr.; Juza, M. et al., **Balloon-borne system for tracking the sun.** *Review of Scientific Instruments*, N. Y., 27(6):381–385, June **1956.** 5 figs. **DWB, DLC, DGL**—A balloon-borne system for tracking the sun both in elevation and azimuth is described. The system weighs approximately 125 lb and is capable of "pointing" as much as 20 lb of payload at a predetermined position in the sky. Power requirements are 20 w. An accuracy in pointing of ±15 min of arc has been achieved. At some sacrifice in simplicity, this accuracy could perhaps be improved to ±5 min. Results of two flights, each attaining an altitude in excess of 100,000 ft, are given. *Subject Heading:* **1. Solar radiation measurement by balloon. I. Maher, T. II. Speck, F.**—*Authors' abstract.*

8.3–108 551.507.362:621.396.6

Jackson, Howard J.; Smith, Harold D., and Post, Cecil C., **Performance of the 580–600 megacycle slot antenna for the aerobee rocket.** New Mexico. College of Agriculture and Mechanic Arts. Physical Science Laboratory, Contract AF 19(604)-409, Scientific Report No. 3, Feb. 7, **1956.** 16 p. 13 figs. (incl. photos.), ref.—Antenna pattern measurements for the 580–600 Mc/sec 3-slot array antenna were made on a section of the Aerobee rocket. Measurements were made in the principal planes through the center of each slot. Measurements of the transmission loss and phase characteristics of the 3-slot array antenna feed harness were made. Transmission loss was found to be 0.5 db ±0.2 db per section, and the relative phase difference at the output of each section was found to be not greater than ±2 degrees. Voltage standing wave ratio measurements were taken on each slot and its associated feed harness, as well as on the complete 3-slot array. *Subject Headings:* **1. Aerobee rockets 2. Radio equipment.**—*Authors' abstract.*

8.3–109 551.507.362:551.547:533.607

Sweeney, Marvin W., Jr., **Supersonic wind-tunnel measurements of surface pressures on a small rocket to be used for upper-air research.** Massachusetts Institute of Technology. Naval Supersonic Lab., Contract AF 19(604)-1208, Wind Tunnel Report, 80, Sept. **1955.** 74 p. 54 figs. (incl. photo., graphs), table, 6 refs., 23 eqs. **DWB**—It is desired to obtain high-altitude ambient pressure from a simple, inexpensive sounding rocket. It is shown in this

eport that this is possible by combining a nose-pitot pressure and a body-surface pressure. Wind tunnel data are presented to aid in determining the feasibility of such a method. An expression is developed for sensitivity, utilizing wind tunnel experimental data to supplement aerodynamic theory for bodies of revolution. *Subject Headings:* **1. Wind tunnel experiments 2. Upper air pressure 3. Rocket soundings 4. Upper atmosphere research.**—*Author's abstract.*

8.3–110 551.507.36

Van Allen, James A. (*State Univ. of Iowa*), **The scientific value of the earth satellite program.** *Institute of Radio Engineers*, N. Y., *Proceedings*, 44(6):764–767, June 1956. **DLC**—Planning for the fullest possible scientific utilization of the initial group of U. S. satellites is proceeding actively under the supervision of the National Academy of Sciences and its appropriate Panels and Working Groups. An inert satellite, tracked from an array of ground stations, will provide a means of unprecedented precision for the determination of the geodetic figure of the earth, for the transoceanic linkage of mapping networks, and for the measurement of atmospheric density at very high altitudes. A variety of physical observations with active, on-board instrumentation has been considered. The highest "flight-priority" has been assigned to the following: a) the monitoring of the intensity of the solar ultraviolet; b) the monitoring of cosmic ray intensity and the measurement of its latitude, longitude, and altitude dependence; c) the measurement of the size spectrum and the number density of interplanetary dust; and d) the measurement of the earth's optical albedo over large areas. A concerted attack on the technical problems of successful on-board observations is being made. *Subject Heading:* **1. Satellite observatory program.**—*Author's abstract.*

INSTRUMENTS

See also: **Instrumentation literature** (Brombacher et al.), 8.3–60; **Micron-sized particles** (Lodge), 8.3–140; **Climatological micro-observations** (Veinberg), 8.3–309; **Automatic auroral recorder** (Hunten), 8.3–337.

8.3–111 551.508:535.33

Fujita, Shigeru, **On the photoelectric measurement spectrum line intensity.** *Tokyo. University of Education. Institute for Optical Research, Science of Light*, 3(1):25–38, Aug. 1954. 3 figs., table, eqs. **DWB**—The signal-to-noise ratio in the photoelectric measurement of the spectrum line intensity was theoretically calculated for the combination of an ordinary phototube and an a.c. amplifier and also for the multiplier phototube. Besides the ordinary method of applying constant voltage to the phototube, another method of applying voltage pulse to the multiplier phototube is also discussed, and the signal-to-noise ratio was found to increase appreciably in this case. *Subject Heading:* **1. Photoelectric spectrometers.**—*Author's abstract.*

8.3–112 551.508:551.584

Grinnell, S. W., **Meteorological instruments and methods developed at Stanford Univ. for studies of the lower atmosphere: an operational manual.** Stanford Univ. Dept. of Chemistry, Contract DA-18-064-cm.-2564, [unnumbered report], June 1955. 145 p. 67 figs. (incl. photos), eqs. **DWB**—A comprehensive survey is reported for determining the ranges, accuracy and response specifications necessary for wind direction and speed measurements involved in air sampling. Various types of anemometers, anemographs, wind vanes, recording or conversion equipment for distance or local reading or recording, portability of equipment, pilot balloon equipment, temperature measurement, at or near the ground by surface thermometers, thermocouples thermistors, etc. and by balloons, wiresondes, aircraft mountings, mobile stations, etc. and, finally, temperature gradient instruments are treated systematically, described and illustrated profusely with photos and line drawings. *Subject Headings:* **1. Micrometeorological instrumentation 2. Atmospheric pollution instruments.**—*M.R.*

8.3–113 551.508.2:551.521.14

Ashburn, Edward V.; Pentoney, C. P.; Hohanshelt, Z. W. and Weldon, R. G. (*all, Naval Ordinance Test Station, China Lake, Calif.*). **Narrow pass band albedometer.** *Review of Scientific Instruments*, N. Y., 27(2):90–91, Feb. **1956.** 2 figs., 3 refs. **DWB, DLC**—An albedometer which allows accurate measurements in narrow wave length bands (90Å) anywhere from 4000 to 6500Å is described and illustrated schematically and by a photograph. The incident radiation enters an integrating sphere. Narrow pass band filters can be easily adjusted between an opal glass window and the receiver. Previous albedometers allowed light to fall directly on the receiver from all angles so that filters could not be used successfully to obtain spectral albedo measurements. *Subject Headings:* **1. Albedometers 2. Spectral albedo measurements.**—*M.R.*

8.3–114 551.508.21:551.521.61(09)

Smith, R. A. (*Radar Research Est., Malvern, Eng.*), **Recent developments in the detection and measurement of infrared radiation.** *Scientific Monthly*, N. Y., 82(1):3–19, Jan. **1956.** 9 figs., 3 tables, 39 refs., 3 eqs. **DLC**—Progress in measurement of infrared radiation, since its discovery in 1800 by WILLIAM HERSCHEL, and the use of thermocouples by MELLONI (1833) and bolometers by LANGLEY (1880), is reviewed. Photographic evidence (E. BECQUEREL, 1843) was at first confined to the near visible bands, but has been extended to 1.3 (1919) by using panchromatic or other sensitized tape, and to 8 recently by using photoconductive cells and by replacing delicate galvanometers with electronic amplifiers (which were not so successful when used with bolometers or thermocouples). Details of development and construction of photoconductive cells and electronic amplifiers (during past 10 years), including lead sulfide, lead selenide and lead telluride cells and semiconductors (lead sulfide); physics and physical chemistry of lead sulfide, etc., are treated. *Subject Headings:* **1. Infrared detectors 2. History of infrared radiation measurement 3. Infrared radiation measurement.** —*M.R.*

8.3–115 551.508.7:061.4

Krupa, V. A., **O vystavke ekonomicheskikh i kul'turnykh dostizheniĭ Sovetskogo Soiuza v Pekine.** [Exhibition of economic and cultural achievements of the Soviet Union in Peking.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:60–61, July/Aug. **1955. DWB**—One of the exhibition booths of the Soviet Exposition in Peking, which was held in 1954, was devoted to hydrometeorological instruments. The exhibition included demonstrations, lectures, and conferences with Chinese hydrometeorologists. *Subject Headings:* **1. Instrument exhibitions 2. Hydrometeorological instruments.**—*I.L.D.*

8.3–116 551.508.79:551.579.4

Zababurin, I. A., **K voprosu izmereniia skorosteĭ na malykh vodotokakh.** [Problem of measuring velocities of small water streams.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:49–51, Jan./Feb. **1955.** 4 figs., eq. **DWB**—The author describes, with the aid of photographs and circuit diagrams, the construction of a rotating microgauge for measuring stream flow at depths of less than 0.2 meter and velocities 0.10–0.15 m/sec. Two types are described: one with a blade screw, the other with a cup rotor. *Subject Heading:* **1. Stream flow meters.** —*I.L.D.*

8.3–117 551.508.72:551.573

†*Garnier, B. J., **Report on experiments to measure potential evapotranspiration in Nigeria.** *Ibadan, Nigeria. University College. Dept. of Geography, Research Notes*, No. 8, Jan. **1956.** 22 p. 5 figs., tables, 5 refs. **DWB**—Three years of experimental work beginning in 1951 at Univ. College, Ibadan with two simple evapotranspirometers; expanded in 1952 and 1953 to include use of evapotranspirometers modified after MATHER's (1951) instrument, and extended to Moor Plantation, Ibadan, Samaru, Daura, Port Harcourt and Vom, are summarized and the data presented in tables and graphs. A graphic comparison is made between measured and computed evapotranspiration at Ibadan and Samaru using modified Thornthwaite method. Difficulties in observations and maintenance are discussed. If adjustments are made for

flooding, and erroneous readings on rare occasions, the results are very consistent with those expected. A list of publications of staff of the Univ. College. Dept. of Geography is appended. *Subject Headings:* **1. Evapotranspiration measurement 2. Evapotransporimeter networks 3. Evaporimeters 4. Ibadan, Nigeria.**—*M.R.*

8.3–118 551.508.72:551.573

*Porkka, M. T., **Results of measurements with Renqvist's evaporation recorder in South Finland in summer 1950.** *Geophysica*, Helsinki, 5(2):70–77, **1956.** 3 figs., 4 tables, 2 refs. **DLC**—Results of evapotranspiration (E) measurements at Tikkurila in South Finland (25°02′E, 60°17′N) with a Renqvist Evaporation Recorder, installed on a hill slope surrounded by an open field, in the summer of 1950 are compared with rainfall, sunshine duration, mean temperature, maximum temperature, saturation deficit, wind speed and cloudiness. Sunshine duration gave a correlation coefficient of $0.74 \pm .08$ and wind speed only $0.28 \pm .17$, whereas cloudiness was -0.56 ± 0.12 when correlated with evapotranspiration. Dependence of E on maximum temperature at different wind speeds is shown on scatter diagram, showing that the effect of wind, while evident, is erratic. *Subject Headings:* **1. Evaporation measurements 2. Evapotranspiration 3. Renqvist evaporimeter 4. Tikkurila, Finland.**—*M.R.*

8.3–119 551.508.822

Guterman, I. G., **Radiatsionnaia oshibka grebenchatogo radiozonda.** [Radiational error of "comb" radiosonde.] *Meteorologiia i Gidrologiia*, Leningrad, No. 5:49–52, Sept./Oct. **1955.** 5 tables, 5 refs. **DWB, DLC**—Several different kinds of temperature recorders variously protected from radiation were used in radiosondes to compare the effect of direct solar radiation on an open bimetallic receiver and the bimetallic receiver enclosed in a container. The radiational errors of various thermographs and radiosondes (sun's elevation 50–60°), the differences in the temperature records of the radiosondes on June 30, 1954 up to the eclipse and afterwards, and the air temperature at standard elevations are given by radiosondes on the day of the eclipse, in tables. *Subject Headings:* **1. Radiation error of radiosondes 2. Radiosonde comparisons.**—*I.L.D.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Weather forecasting** (Lu), 8.3–9; **Mediterranean Basin meteorological study** (Berenger), 8.3–17; **Terminal forecasting** (Gringorten et al.), 8.3–18; **Arctic met. investigations** (Hare), 8.3–43; **Locating thunderstorm centers** (Perlat), 8.3–98; **Barotropic model of atmos.** (Vítek), 8.3–154; **Prediction of tropical cyclone tracks** (U. S. Bur. of Aeronautics), 8.3–163; **Tornado composite charts** (Beebe), 8.3–165; **Tornadoes of April 2 and 3, 1956** (Hanks), 8.3–166; **Frost protection with fans** (Van Eimern), 8.3–185; **Use of marine obs. data in weather forecasting** (Yamaguchi), 8.3–187; **Relation between surface and upper air pressure . . .** (Zikmunda), 8.3–204; **Precipitation at stations in Illinois** (Hiser), 8.3–259; **Runoff forecasting** (Hopkins), 8.3–270; **Hydromet. analysis of Danube floods** (Kallós), 8.3–276; **Flood forecasting of the River Watari** (Yamamoto), 8.3–278; bibliog. on **Specialized Forecasting**, p. 372–401.

8.3–120 551.509.3:551.510.42

Mittner, R., **Facteurs et situations météorologiques à considérer dans les problèmes de pollution atmosphérique.** [Meteorological factors and situations to be considered in atmospheric pollution problems.] *La Météorologie*, Paris, Ser. 4, No. 39:235–246, July/Sept. **1955.** 8 figs., 17 refs. English and Spanish summaries p. 235. **DWB**—The synoptic situations connected with four cases of severe atmospheric pollution (Meuse valley, Belgium, Dec. 1930; London, Dec. 1952; Paris, Dec. 1951 and Feb. 1954) are shown in charts and commented on. All four cases involved persisting anticyclonic situations, strong radiational inversions (aerological diagrams presented) and turbulent mixing within the thin inversion layers. *Subject Headings:* **1. Atmospheric pollution studies 2. Synoptic studies.**—*G.T.*

8.3–121 551.509.31

§Gal'tsov, A. P., **Pogoda i ee predskazanie.** [The weather and its forecasting.] *Vsesoiuznoe Obshchestvo po Rasprostraneniiu Politicheskikh i Nauchnykh Znanii*, Moscow, Ser. 3,

No. 3, **1955.** 30 p. 10 figs., 7 refs. **DWB**—A popular pamphlet giving the basic principles of synoptic meteorology and forecasting, with a few examples for Eastern Europe. Observations, synoptic charts, pressure and wind, temperature and temperature changes, precipitation formation, weather types, cyclones and fronts, etc. are discussed in separate chapters by way of introduction. *Subject Headings:* **1. Synoptic forecasting 2. Popular meteorology.**—*M.R.*

8.3–122 551.509.312

Gilchrist, B., **Introduction to numerical methods.** (In: American Meteorological Society District of Columbia Branch, **Proceedings of the Workshop of Numerical Weather Predictions** Wash., D. C., June **1954.** p. 28–35. 3 figs., 3 eqs.) **DWB**—Errors in numerical weather prediction introduced by using differences instead of derivatives on a line or surface are discussed, depending on the number of grid points per wave length. Additional errors are introduced by the time element, round-offs and the unreliability of the initial errors. *Subject Headings:* **1. Numerical forecasting 2. Forecast errors.**—*A.A.*

8.3–123 551.509.312:551.515.2(213)

Jordan, Charles L. (Chic. Univ.), **An experiment in low latitude numerical prediction with the barotropic model.** Chicago. Univ. Dept. of Meteorology, Contract N6ori-02036, [unnumbered report], Sept. **1955.** 29+p. 40 figs., 4 tables, 25 refs., eqs. **DWB**—Three series of numerical predictions were run for a low latitude grid (Western Atlantic and Caribbean area): Aug. 25–29, Sept. 23–27 and March 29–April 2, 1953. The results (difference between observed and forecast 24-hour 500 mb height change) are tabulated, correlation coefficients calculated and charts or graphs of several types (500 mb, 200 mb, absolute vorticity, tephigrams, wind profiles, hurricane [Florence] tracks, cloudiness, etc.) presented and discussed. It is concluded that numerical predictions can be extended to low latitudes in spite of the severe analysis problem (lack of dense or accurate enough networks) if broad general motions are involved. More detailed numerical analysis will be possible with rawinsonde stations now being installed in area. Most features of hurricane Florence were smoothed out in the process—only the steering direction and speed would have been of any value in prediction. *Subject Headings:* **1. Numerical forecasting for subtropics 2. Hurricane forecasting by numerical methods 3. Tropical weather forecasting.**—*M.R.*

8.3–124 551.509.312:551.557:551.515

Mulky, G. R. (*Regional Met. Centre, Bombay*), **Kinematic analysis of upper wind fields.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(2):163–170, April **1955.** 10 figs. 8 eqs. **DWB, DLC**—The paper explains a method of computing the velocity and direction of movement of troughlines, cyclonic centers, etc. associated with upper wind fields by evaluating vectorial changes of wind with time. The method is similar to the one first proposed for surface pressure fields by PETTERSSEN, but has the advantage that it can be used for any level for which sufficient wind data are available. The displacement of a troughline in a pressure field is obtained by PETTERSSEN in terms of pressure derivatives of the second order; in the present paper it is shown that the displacement of a troughline in a wind field is obtained in terms of wind velocity derivatives of the first order. The inaccuracy of upper wind data as compared to surface pressure data is somewhat offset by the lower order of the terms in the equations for the displacement of troughlines. *Subject Headings:* **1. Kinematic analysis 2. Upper air winds 3. Trough movement.**—*Author's abstract.*

8.3–125 551.509.317:551.515.81:551.55

Vuorela, L. (*Helsinki*), **Über die Luftbewegung im Zusammenhang mit Vorstössen tropischer Luft in höheren Schichten über Nordwesteuropa.** [Air movement in connection with the advance of tropical air in higher strata over Northwestern Europe.] *Berlin. Freie Universität. Institut für Meteorologie und Geophysik, Meteorologische Abhandlungen*, 2(3):152–172, **1954.** 14 figs., 14 refs. **DWB**—The author presents several vertical sections illustrating cases of invasions of tropical air into the higher latitudes. The synoptic situations of Jan. 16, 1951 and Nov. 7, 1952 are analyzed. The behavior of the tropopause and the presence of a marked baroclinity in the vicinity of the upper part of the polar front, the intensive change of shear with latitude associated with winds, etc., and zonal wind maxima are discussed. A

simple model of the vertical circulation perpendicular to the wind flow associated with the polar front and jet stream is developed. Analyses of dew point differences were the basis of conclusions on the vertical frontal movements and the tropopause. Also the occurrence of a similar phenomenon with its subtropical jet stream is considered. *Subject Headings:* **1. Synoptic aerological studies 2. Polar front displacements 3. Jet stream models 4. Northwest Europe.**—*Based on author's abstract.*

8.3–126 551.509.318:551.515.13

§George, Joseph J. and Wolff, Paul M., **Prediction of cyclone intensity over the North Atlantic.** U. S. Bureau of Aeronautics (Navy), Project AROWA (TED-UNL-MA-t01.13), [Unnumbered] Research Report, March **1955.** 52 p. numerous charts. **DWB**—A simple method of forecasting amount of deepening or filling of cyclones over the North Atlantic during winter was devised from a study of all cyclones during 1949–50, 50–51, 51–52, and Nov.–Dec. 1952, and was tested on cyclones in Jan. 1953 and Jan. 1955. If the surface cyclones lies under a closed 500 mb contour the cyclone will fill (217 verified out of 235 cases for dependent data and 52 out of 56 independent cases). If the cyclone lies under an open 500 mb flow pattern, a forecast of deepening verified 186 times out of 209 for dependent and 39 times out of 44 for independent data. Overall accuracy for 544 cases was 91%. If deepening was indicated, two more steps, involving a wind and a temperature parameter normal to low center across 500 mb contours, are outlined to get idea of intensity of deepening. Twenty synoptic examples are given. *Subject Headings:* **1. Cyclone intensity forecasting 2. Cyclogenesis 3. North Atlantic. I. U. S. Bureau of Aeronautics (Navy) II. Project AROWA (TED-UNL-MA-501.13).**—*M.R.*

8.3–127 551.509.318:551.524

Péczely, György, **Adalékok Magyarország makroszinoptikus helyzeteinek hőmérsékleti viszonyaihoz.** [Thermal conditions of large-scale synoptic situations in Hungary.] *Időjárás*, Budapest, 60(2):71–81, March/April **1956.** 2 figs., 6 tables, 4 refs. Russian and German summaries p. 71. English version p. VI–XII. **DLC**—Fifteen types of large-scale synoptic situations are established. Monthly averages of mean daily temperature at Budapest are given for each synoptic type on the basis of a 60-year record. The monthly means related to each type are expressed in terms of Köppen's relative temperature and compared with annual variations at a coastal and a continental station by using the χ^2 test. For anticyclones persisting 5 days the average temperature change is computed as an indication of air-mass transformations. *Subject Headings:* **1. Large scale weather processes 2. Synoptic situations 3. Mean diurnal temperatures 4. Hungary.**—*Trans. of author's abstract.*

8.3–128 551.509.33

*Graves, Maurice E. (*Panamerican-Grace Airways*), **Anomalíes en el tiempo de superficie sobre el Territorio de Sudamérica Occidental.** [Anomalies in the surface weather over Western South America.] *Compañía Administradora del Guano, Lima, Boletín Científico*, 2:49–52, **1955.** figs., table. **DWB**—The author analyzes various meteorological anomalies observed in 1954 at the surface of the western coast of South America from Chile to Ecuador. A table giving the anomalies for the various elements at eleven stations for which anomalies have been calculated and graphs showing the normal and deviation from normal during 1954 are presented. *Subject Headings:* **1. Weather anomalies 2. Western South America.**—*I.L.D.*

8.3–129 551.509.34:551.524.36:551.521.2

Saunders, W. E., **Night cooling under clear skies, Exeter airport.** *Meteorological Magazine*, London, 83(979):9–11, Jan. **1954.** 3 figs., 2 refs. Also: Richardson, W. E., **Night cooling under clear skies at high-level stations in Cumberland.** *Ibid.*, 84(1000):301–304, Oct. **1955.** 3 figs., table, 11 refs. Also: Richardson, W. E., **Night cooling curves for Ardnagoichan.** *Ibid.*, 85(1009):218–219, July **1956.** fig., 2 refs. **DWB**—(1) Evening temperature discontinuity previously found at Northolt (*R.M.S., Q.J.*, 78:603, **1952**) also found at Exeter. Curves are given for forecasting minimum temperature. (2) Thermograph records at two stations (east slope and valley bottom) at Alston, Cumberland, were analyzed for variation of night minimum temperature, and time and temperature of evening discontinuity, their

relations and the differences between the two sites. (3) The times of the evening discontinuity of temperature in 57°9′N, 1000 ft a.s.l. were plotted for 1955. The spring bulge is well shown. Throughout the year the minimum temperature was about 6°F below the temperature at the discontinuity. *Subject Headings:* **1. Minimum temperature forecasting 2. Single station forecasting 3. Nocturnal cooling 4. England.**—*C.E.P.B.*

ARTIFICIAL PRECIPITATION

8.3–130 551.509.67

Mull, S. and Chakravarty, K. C. (*Met. Office, Calcutta*), **Suitability of rain-making methods in different parts of India during various seasons.** (In: Symposium on Artificial Rain, New Delhi, Feb. 1953, **Proceedings and Papers.** pub. **1955.** p. 92–103. 3 figs., 4 tables, 20 refs.) **DWB**—The cloud fields (the types of clouds, heights of their bases and tops, their sizes, etc.) in different parts of India and in different seasons, particularly in association with the passage of storms of sea origin and western disturbances, suitable for various types of experiments are examined and discussed with reference to the results obtained so far. The question whether the production of artificial rain in a particular region in India may lead to scarcity of rain in its neighbouring region is also discussed. The study reveals that although the scope of artificial rain-making in India, from the practical point of view, is rather limited on account of some characteristic features, such as freezing level being generally high, the frequency of occurrence of clouds without rain at places and times where and when rain is badly needed being low, it may be possible to develop suitable methods for producing artificial rain in certain parts of India and certain seasons after conducting elaborate laboratory and field experiments. The paper contains a brief discussion on the scope of artificial rain-making in India, with particular reference to the prevailing meteorological conditions over the country. *Subject Headings:* **1. Artificial precipitation 2. Cloud seeding studies 3. India.**—*Authors' abstract.*

8.3–131 551.509.67

Oddie, B. C. V., **Rain-making.** *Agriculture*, London, 62(11):512–515, Feb. **1956. DA**—The development of the idea of rainmaking is traced. It is argued that rainfall in one region can only be slightly increased (not originated) at the expense of some other regions. Results of trials are inconclusive. The Salisbury Plain experiments are briefly described, but it is too early to form conclusions. *Subject Heading:* **1. Artificial precipitation.**—*C.E.P.B.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION AND STRUCTURE OF THE ATMOSPHERE

See also: **Nitrogen oxides in atmos., chemistry and vertical distribution** (Miller), 8.3–21; **Terminology of atmospheric shells** (Wares), 8.3–65; **Atmos. ozone reduced thickness and surface concentration** (Rasool), 8.3–144; **Variations of ozone and water vapor concentrations** (Brewer), 8.3–157; **Eclipse effects on ionosphere and geomagnetic field** (Nagata et al.), 8.3–314.

8.3–132 551.510.41:551.578.11

Larson, T. E. and Hettick, Irene (*both, Ill. State Water Survey*), **Mineral composition of rainwater.** *Tellus*, Stockholm, 8(2):191–201, May **1956.** 10 figs., 3 tables+tabular appendix, 12 refs., eqs. **DLC**—Analyses of 62 rainwater samples collected at the University of Illinois Airport near Savoy, Ill., showed that on the basis of equivalent concentrations, the chloride is equal to the sum of sodium and potassium. Sodium was three times the potassium. Calcium plus magnesium was 10 times the chloride and equal to the sum of the bicarbonate and sulfate. The sulfate was equal to twice the sum of ammonium and nitrate. These results indicate salt from sea mist to constitute a negligible proportion of the mineral content. They also indicate the presence of air pollution by the combustion of fuel. *Subject Headings:* **1. Chemical composition of rainwater 2. Savoy, Illinois.**—*Authors' abstract.*

8.3–133 551.510.41:546.293

§Nicolet, M., **The origin of atmospheric argon.** Pennsylvania. State Univ. Ionosphere Research Laboratory. Contract AF 19(604)-1304, Scientific Report, No. 87, June 1, **1956.**

27 p. 5 figs., 36 refs.—From analysis of geochemical data it is learned that radiogenic argon has been introduced into the terrestrial atmosphere. A^{40} was one of the first elements present in the atmosphere and, ever since the earth's formation, has acted as a screen by preventing solar X-rays and ultraviolet radiation, at wavelengths less than 800A, from penetrating to the surface of the earth. *Subject Heading:* **1. Atmospheric argon.**—*Author's abstract.*

ATMOSPHERIC POLLUTION

See also: **Sanitary protection of air** (Riazanov), 8.3–26; **Stack heights to minimize ground concentrations** (Hewson), 8.3–86; **Met. factors in atmos. pollution** (Mittner), 8.3–120; **Mortality from fog, London, Jan. 1956** (Logan), 8.3–254.

8.3–134 551.510.42

Dikun, P. P.; Shabad, L. M. and Norkin, V. L., **Nekotorye novye dannye o zagriaznennosti atmosfery promyshlennykh gorodov 3, 4-benspirenom.** [Some new data on the pollution of the atmospheres of industrial cities with 3–4 benzopyrene.] *Gigiena i Sanitariia*, Moscow, 21(1):6–11, Jan. **1956.** 3 tables, 11 refs. **DLC**—The pollution of the atmosphere of Leningrad and its environs, with the carcinogenic compound 3–4 benzopyrene was investigated by examining snow samples collected over a specified time interval from a given area in various locations and determining quantitatively the amount of this substance by a chromatographic fractionation method. The 3–4 benzopyrene content of snow samples collected in various parts of the city is used to estimate the amount of this substance thrown out annually into the atmosphere and data are given in a table. Amounts as high as 7.5 mg/1/m²/6 mos were recorded in some localities. It is noted that 3–4 mg introduced into experimental mice produce cancer. *Subject Headings:* **1. Atmospheric pollution 2. Air sampling and analysis 3. Carcinogenic substances 4. Leningrad, U.S.S.R.**—*I.L.D.*

8.3–135 551.510.42

Frenkiel, F. N. (*Johns Hopkins Univ.*), **Atmospheric pollution and zoning in an urban area.** *Air Pollution Control Association, 48th, Detroit, Mich., May 1955, Proceedings*, pub. **1955.** Section 4. 27 p. 5 refs. **DLC**—The general aspects of urban air pollution (sources, control, zoning, dispersion) are considered and a mathematical model of pollution in an urban area proposed. The relative contributions of different major types of sources, the effect of local sources, allowable concentrations, emergency measures to take when allowable concentrations are reached, prediction of patterns on a short range (12–24 hr) and a long range (10–25 yrs) scale, reduction of pollution, air-zoning for new sources, use of high speed computers in ordinary and in civil defense, prediction of serious conditions, and, finally, urban planning to provide optimum conditions are discussed and illustrated by numerous schematic charts or diagrams. *Subject Headings:* **1. Atmospheric pollution control 2. Urban pollution control 3. Civil defense 4. Los Angeles, Calif.**—*M.R.*

8.3–136 551.510.42:061.3

Gol'dberg, M. S.; Kovarskiĭ, M. S.; Mats, L. I. and Ruffel', N. A., **Vsesoiuznaia konferentsiia po voprosam gigieny atmosfernogo vozdukha, gigieny vody i sanitarnoĭ bakteriologii.** [All-Union conference on the hygiene of atmospheric air, the hygiene of water and medical bacteriology.] *Gigiena i Sanitariia*, Moscow, No. 12:45–47, Dec. **1955. DLC**—The conference held May 16–20, 1955 in Moscow, discussed the effect of air pollution upon human beings, animals and plants, the introduction of air filters in industrial plants and hydroelectric stations, methods for determining concentration and identification of pollutants in the atmosphere, a program for the study of problems of air pollution resulting from industrial activities, etc. *Subject Headings:* **1. Atmospheric pollution 2. Atmospheric pollution conferences 3. Moscow, U.S.S.R.**—*I.L.D.*

8.3–137 551.510.42

*Gruber, Charles W. and Alpaugh, Edwin L. (*both, Cincinnati Bur. of Smoke Inspection*), **Automatic filter paper sampler in an air pollution measurement program.** *Air Repair*, Pittsburgh, Pa., 4(3):143–147, Nov. **1954.** 10 figs., 3 tables, 3 refs. Also: Discussion of above

paper by W. C. L. Hemeon; Harold M. Ide; H. C. Johnson; E. Wendell Hewson; Morris Katz; Richard I. Huling; John C. Marks and M. D. Thomas. *Ibid.*, p. 147–150, 171–172. **DLC**—It takes decades to accumulate enough experience with weather influences on atmospheric pollution build-up to understand the problem well enough to make control measures really effective, because the worst conditions may occur only at rare intervals. Six automatic smoke samplers (AISI sampler developed by the Mellon Institute and described by W. C. L. HEMEON, 1953) have been installed in Cincinnati area from time to time since Jan. 1952. Sampling methods and results are described in detail and illustrated by maps, graphs and charts. Experience showed that sampling for suspended matter does not require such careful selection of sites, as does sampling for dust fall, although direct paths from smoking chimneys must be avoided. Pollution in an area is fairly uniformly distributed and not affected by local objects. Samplers must be calibrated from time to time. Comparison of samples (over several days or weeks) obtained at different elevations and in different sections (residential) of Cincinnati, show remarkably little variation compared with day-to-day or even week-to-week variations. Effects of inversions, wind, temperature, time of day, lapse rate, etc. are revealed clearly by numerous graphs. HEMEON presents data for Pittsburg residential areas and shows that, using 2-hour instead of 6-hour exposures described by GRUBER and ALPAUGH, they obtained remarkably similar results at 2 close ($\frac{3}{8}$ mile–150 ft elev difference) stations, at 2 regions 4 miles apart and even at 2 cities as far apart as Columbus, Ohio and Pittsburg, showing that day-to-day changes are more likely due to changes in stability of the atmosphere over a wide area than due to either local smoke emission or wind conditions. However, for long period data and inter-city comparisons, light transmission methods are believed superior to the filter paper soiling method used in these studies. *Subject Headings:* **1. Atmospheric pollution measurement 2. Atmospheric pollution variations 3. Cincinnati, Ohio 4. Pittsburg, Pa.** —*M.R.*

8.3–138 551.510.42

Hewson, E. Wendell (*Prof. Met., Mich. Univ.*), **Air pollution control and the weather.** *Michigan Business Review*, 7(3):17–21, May **1955.** Abstracted from reprint.—In nontechnical language the author discusses several of the recent disasters produced by smog, the effect of weather upon smog, air pollution control, the role of local weather and climate in smog control, plant location, design and operation and city planning in relation to smog control, air pollution by aeroallergens and ragweed production and control. *Subject Headings:* **1. Atmospheric pollution 2. Atmospheric pollution control 3. Smog.**—*I.L.D.*

8.3–139 551.510.42:551.574.1:543

Junge, Christian E. (*U. S. A. F., Cambridge Research Center*), **Recent investigations in air chemistry.** *Tellus*, Stockholm, 8(2):127–139, May **1956.** 7 figs., 10 tables, 12 refs., eqs. **DLC**—1. New results of chemical analyses of natural aerosol particles in Florida and in the Boston area are presented. 2. These data are compared with the results obtained earlier at various other locations. The continental and maritime components of NH_4, Na, Cl, SO_4, and NO_3 can be separated for two different size ranges, viz. large particles (radius 0.08μ to 0.8μ) and giant particles (radius 0.8μ to 8μ). It is found that the continental influence on aerosols extends far into the ocean. 3. The nitrate content of the particles presents an especially interesting problem, since it appears that the major part of NO_2 stems neither from a continental nor from a maritime source, but from a certain area along the coast. 4. A comparison is made of the total amounts of material found in the large and the giant particles of the various locations. Information gained from this comparison provides the basis for conclusions regarding the size distribution of aerosols. A pronounced difference between maritime and continental distributions becomes evident in this case. 5. The concentration of the corresponding gas traces of NH_3, SO_2, nitrogen oxides and chlorine components were measured in Florida and at other locations simultaneously with the chemical analysis of the aerosols. For most components the concentration of these gas traces is considerably higher than that for the corresponding substances in the aerosols. The importance of these findings for air chemistry is discussed. *Subject Headings:* **1. Chemical analysis of aerosols 2. Aerosol origin.** —*Author's abstract.*

8.3–140 551.510.42:551.508.91

Lodge, James P. (*Cloud Physics Project, Chicago Univ.*), **Analysis of micron-sized particles.** *Analytical Chemistry*, Wash., D. C., 26(11):1829–1831, Nov. **1954.** 6 figs., 6 refs. **DLC**—The commercial filter material Millipore was utilized as a medium for sampling and analyzing particles in the micron-size range. Studies of ammonium, calcium, and magnesium ions, halides, sulfates, and nitrates indicate that the technique is suited for identification of atmospheric particulate matter. *Subject Headings:* **1. Particle analysis 2. Sampling techniques.** —*Author's abstract.*

8.3–141 551.510.42:551.584.61

Zubarev, V. A., **K metodike izucheniia bakterial'nogo zagriaznenia vozdukha.** [Procedure of study of bacterial contamination of air.] *Gigiena i Sanitariia*, No. 7:35–36, July **1954.** fig. **DLC**—The structure and working principle of a simple but very effective device for the determination of the content of bacteria in the air (hospitals) is described and explained. It proved to be more efficient than the existing complicated and expensive apparatus. *Subject Headings:* **1. Bacterial content of air 2. Air sampling instruments 3. Indoor air.**—*A.M.P.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Launching rocket into orbit about earth** (Lawden), 8.3–71; **Solar hypothesis,** test (Palmer), 8.3–151; **Height and temp. of stratosphere** (Zerinvari), 8.3–191; **Ionospheric drifts and related phenomena . . .** (Yerg), 8.3–230; **Tropospheric scattered fields** (Trolese), 8.3–349.

8.3–142 551.510.5:551.524.7:551.543.1

Sawada, R. (*Central Met. Obs., Tokyo*), **The atmospheric lunar tides and the temperature profile in the upper atmosphere.** *Geophysical Magazine*, Tokyo, 27(2):213–236, March **1956.** 15 figs., 5 tables, 11 refs., 7 eqs. **DWB, DLC**—The atmospheric lunar tides for temperature profiles which have rather cool ozonospheres (262–271°K) are discussed and are shown to give more satisfactory tides than that of rather warm ozonosphere which was computed in his last paper (1954). The dependence of the surface pressure oscillation to the temperature of the top atmospheric layer is established. Surface wind components are also computed to show the sensitive dependence of the phase angle to the ozonospheric temperature. Vertical structure of tides are also presented to show that the most sensitive changes in the phase angles of tides occur in the lowest atmosphere below 25 km, above which practically no dependence to the temperature of the ozonosphere is shown as far as the phase angles are concerned, while this is not the case for the amplitudes. Summarizing these results it is concluded that the real temperature profile in the upper atmosphere may be near by profile no. 31 which has the maximum temperature of 262.33°K in the ozonosphere. *Subject Headings:* **1. Temperature profiles 2. Lunar atmospheric tides 3. Ozonosphere 4. Upper atmosphere research.**—*Author's abstract.*

8.3–143 551.510.534

Epstein, Edward S.; Osterberg, Charles and Adel, Arthur (*all, Atmospheric Res. Obs., Flagstaff, Ariz.*), **A preliminary announcement: a new method for the determination of the vertical distribution of ozone from a ground station.** *American Meteorological Society, Bulletin*, 37(1):37–38, Jan. **1956.** 7 refs. **DWB, DLC**—Observations by means of the ultraviolet and infrared technique provide sufficient information to determine the vertical distribution of atmospheric ozone. The method involves successive approximations. The atmosphere is divided into N layers or elements of which the central temperatures and pressures are taken from radiosonde reports. A method of determining the cumulative effective thickness of ozone through each layer is presented. The downward radiation intensity from the ozone as a function of vertical distribution of ozone and vertical distribution of temperature is used to compare the radiation expected from the assumed ozone distribution and that observed. The results of various distributions computed are discussed. *Subject Headings:* **1. Vertical ozone distribution 2. Ozone measurement.**—*I.L.D.*

8.3–144 551.510.534:551.510.41:546.214

Rasool, Ishtiaq, **Relation entre l'épaisseur réduite de l'ozone atmosphérique et sa concentration au niveau du sol.** [Relation between the reduced thickness and the surface concentration of atmospheric ozone.] *Académie des Sciences, Paris, Comptes Rendus,* 242(17): 2168–2171, April 23, 1956. fig., table, 4 refs. **DLC**—Continuous recordings of ozone concentration at the ground surface are compared day by day with total ozone values, without any significant correlation showing between the two values. A negative correlation is found between amount of ozone at the surface and the number of cases of inversion. Seasonal variations of surface and total ozone are analogous but surface ozone has an additional minimum in June when the wind blows from the metropolitan area of Paris. *Subject Headings:* **1. Ozone distribution 2. Ozone near the ground.**—*Trans. of author's abstract.*

8.3–145 551.510.534:535.24

Yamasaki, M., **Preliminary works on the observation of the atmospheric ozone.** *Tateno, Japan. Aerological Observatory, Journal,* 5(3):171–187, March 1954. 12 figs., 6 tables, 18 refs. In Japanese; English summary p. 171. **DLC**—Spectro-photometric measurements of ozone were made by the Long method, using several wave-lengths between 3095 and 3015 Å. Observation on Feb. 3, 1951 gives $x=0.26$ cm as the total amount of ozone, while others give much larger values. The values of atmospheric extinction coefficient, including ozone absorption, Rayleigh scattering and large particle dispersion are too small in the lower wavelengths and too large in the shorter wavelengths. It is believed that scattered light in the optical system is the main source of error. To eliminate this it is intended to use a double monochromator combined with a photomultiplier. *Subject Heading:* **1. Spectrophotometric observation of ozone.**—*From author's abstract.*

8.3–146 551.510.535:551.594.13

Appleton, Sir Edward V.; Lyon, A. J. and Pritchard, Mrs. A. G., **The detection of the S_q current system in ionospheric radio sounding.** *Journal of Atmospheric and Terrestrial Physics,* 7(4/5):292–295, Oct. 1955. fig., 7 refs., 6 eqs. **DWB**—The behavior of the E layer is inconsistent with CHAPMAN's classical theory. One anomaly is due to the effect of electron transport phenomena on diurnal variation of maximum electron density. The noon delay of maximum N_m differs from that given by CHAPMAN's theory in showing a minimum at the equator and maxima in 40°N and 30°S. This is attributed to the S_q overhead current system. *Subject Headings:* **1. Ionospheric currents 2. E layer.**—*C.E.P.B.*

8.3–147 551.510.535:551.594.13

Appleton, Sir Edward V.; Lyon, A. J. and Turnbull, Mrs. A. G., **Distortion of the E layer of the ionosphere by electrical currents flowing in it.** *Nature,* London, 176(4489):897–899, Nov. 12, 1955. fig., 7 refs., 4 eqs. **DWB**—Comparison of the maximum ionization density N_m in the E layer with that predicted by CHAPMAN's theory shows that a disturbing factor is present, dependent on latitude and even causing afternoon values of N_m near the equator to be less than corresponding morning values. This factor is the vertical drift of neutral ionization, connected with the S_q overhead currents which attain their maximum at 10–11 h local time and are E–W in middle and W–E in low latitudes. There is another factor besides cos χ which causes N_m to be greater in low than high latitudes. *Subject Headings:* **1. E layer 2. Ionospheric currents.**—*C.E.P.B.*

8.3–148 551.510.535:523.77:537.531 551.507.362:551.521.7

Byram, E. T.; Chubb, T. A. and Friedman, H. (*all, U. S. Naval Res. Lab., Wash., D. C.*), **The solar x-ray spectrum and the density of the upper atmosphere.** *Journal of Geophysical Research,* Wash., D. C., 61(2, Pt. 1):251–263, June 1956. 5 figs., 3 tables, 11 refs., eqs. **DLC**—The flux density of solar x-rays arriving in the E region of the ionosphere was measured by means of photon counters in rockets. Flux densities as a function of altitude were obtained in the spectral bands 8Å to 20Å, 44Å to 60Å, and 44Å to 100Å. The data were extrapolated to zero air mass to give the respective flux densities in the three bands outside the atmosphere. To a first approximation, the observations may be fitted to a 700,000 deg K Planckian distribution of solar x-rays with a total flux density of about 0.1 erg cm^{-2} sec^{-1} at the earth.

A more refined analysis reveals that it is an oversimplification to assign a single temperature to the entire corona. The shortest wavelengths, 8Å to 20Å, appear to have come from a hotter source, at a temperature between one and two million deg K. From the rate of x-ray absorption between 128 and 110 km and known mass absorption coefficients for air, the atmospheric density was computed to be about one-third the current Rocket Panel average values. *Subject Headings:* **1. Solar x-ray spectrum 2. Ionospheric density 3. Rocket investigations.**—*Authors' abstract.*

8.3–149 551.510.535

Davids, N. and Parkinson, R. W., **Wave solutions for critical and near-critical coupling conditions in the ionosphere.** *Journal of Atmospheric and Terrestrial Physics*, London, 7(4/5):173–202, Oct. **1955.** 8 figs., 2 tables, 15 refs., 95 eqs. **DWB**—Principal dielectric axis co-ordinates are used to put the coupled wave equations for ionospheric propagation into a form which is suitable for an analysis of critical coupling. This approach removes the singularity formerly associated with critical coupling. The analysis is carried out through the second order and compared with some recent data on polarization. The results compare favorably for several ionosphere models considered. A satisfactory analysis of split echoes at 150 kc/s is developed. *Subject Heading:* **1. Ionosphere theory.**—*Authors' abstract.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

8.3–150 551.511:551.507.321.2

Landers, Holbrook (*Florida State Univ.*), **A study of small-scale atmospheric motion, Pt. 2, Divergence and vorticity.** Florida. State Univ. Dept. of Meteorology. Contract Nonr-1600(00), Technical Report, No. 6, April 15, **1956.** 34 p. 11 figs., 6 tables, 5 refs., 9 eqs. **DWB**—Divergence and vorticity are computed for a small area of about ½ sq. mi from the changes in area and orientation of a triangle formed by three pilot balloons as they ascend. Mean local, seasonal ascension rates were previously determined at 0300 Z and 1500 Z (for Tallahassee, Fla., in summer of 1954) for the purpose of making these divergence and vorticity computations. The magnitudes and vertical distributions of the divergence and vorticity are discussed. Levels of least divergence are located at about 6000 ft and 13,000 ft, showing close agreement with an earlier study which dealt with a scale of motion compatible with the normal upper wind network. In one triple-balloon run there is strong evidence that a narrow zone (no more than 3000 ft wide) may exist in a horizontal plane across which the wind direction changes about 130°. *Subject Headings:* **1. Divergence 2. Vorticity experiments 3. Balloon trajectories.**—*Author's abstract.*

8.3–151 551.511:551.510.5:523.75

Palmer, C. E., **First synoptic test of the solar hypothesis.** California. University at Los Angeles. Institute of Geophysics. Oahu Research Center, Contract AF 19(604)-546, Scientific Report, No. 11, July **1955.** 9 p. 8 figs. (4 fold.), 2 tables, 12 refs.—The report offers evidence that confirms the hypothesis that the occurrence of solar flares and fluctuations in the vertical component of vorticity at 30,000 ft over the Marshall Islands are correlated. The hypothesis, shortly referred to as the solar hypothesis, was originally developed during the study of data from the 1951 weapon tests in the Marshalls. In this report new data, from the 1952 tests in the same area, are used to check the hypothesis. At the same time corrections to the theoretical part of the work, necessitated by published criticisms, are briefly introduced. *Subject Headings:* **1. Solar hypothesis 2. Solar flares 3. Vorticity theory.**—*Author's abstract.*

8.3–152 551.511:551.552:551.542.1

Peterson, Roy E., **A comparison of relative vorticities computed from geostrophic and observed winds.** New York Univ. College of Engineering. Research Div., Contract Nonr-285(09), Technical Paper, No. 5, March **1956.** 45 p. 11 figs., 10 tables, 13 refs., 7 eqs. **DWB**—Two objective studies are made of geostrophic relative vorticity computed from the height field and of observed relative vorticity computed from wind components at 500 mb. In the first study an assumption was made of linear wind variation such that ob-

served vorticity on a 600 km scale was assumed to be representative of the 300 km scale on which the geostrophic vorticity was computed. The very poor agreement of the vorticities computed by this method indicated that this assumption was erroneous. A second study was made, therefore, of 600 km scale observed vorticity and of 300 km and 600 km scale geostrophic vorticity. The comparison of geostrophic vorticity of different scales indicated the importance of grid size in the computations. The comparison of observed and geostrophic vorticity of the same scale indicated small though significant differences. *Subject Headings:* **1. Vorticity computations 2. Geostrophic vorticity.**—*Author's abstract.*

8.3–153 551.511:551.542.1

Vítek, Vojtěch, **Analysa ageostrofické vorticity.** [Analysis of ageostrophic vorticity.] *Meteorologické Zprávy*, Prague, 8(4):95–96, Aug. **1955.** 6 eqs., ref. **DWB**—The author develops geostrophic and ageostrophic vorticity equations. It is shown that the geostrophic approximation to the calculation of absolute vorticity is subject to error. To eliminate such error, components of the ageostrophic equation should be taken into account. *Subject Headings:* **1. Vorticity computations 2. Geostrophic vorticity approximation.**—*G.T.*

8.3–154 551.511:551.513.1:551.509.311

Vítek, Vojtěch, **Některé vlastnosti barotropního modelu atmosféry.** [Some properties of the barotropic model of the atmosphere.] *Meteorologické Zprávy*, Prague, 9(2):25–32, **1956.** 35 eqs. Russian and English summaries p. 25. **DWB**—The barotropic model is studied from two points of view: from the hydrodynamic aspect and from the aspect of numerical prediction. In the first place an arbitrary horizontal frictionless flow is studied and a new method of analysis is given. The resulting equation (3) is valid under the assumption that the absolute vorticity is different from zero. The individual terms of this equation are called the pseudogeostrophic, pseudokinetic, antistationary and pseudoconvective. An equation for ageostrophic vorticity is further derived and discussed. The complete equations characterizing an arbitrary horizontal flow are then applied to the horizontal nondivergent flow and it is shown that the horizontal nondivergent flow has some simple qualities. A necessary and sufficient condition is derived for the coincidence of an isobaric surface with the level of nondivergence and this condition is formulated in two different ways. In deriving this condition it is assumed that the Coriolis parameter has a constant value. It is shown that the ageostrophic flow in the level of nondivergence is steady and a new function (the barotropic potential) is introduced which enables the construction of ageostrophic streamlines. A simple relation between the relative vorticity and the deformation of the nondivergent flow is derived and the significance of the negative absolute vorticity is briefly discussed. For the purpose of numerical prediction of the 500 mb level the vorticity equation can be used in its complete form. The resulting equation (33) can be taken for a generalization of the barotropic vorticity equation. As the equation (33) has a baroclinic character, the nondivergent flow in the model used cannot determine its own development. The solution of the equation (33) depends on the solution of the prognostic equation (35) which describes the vorticity changes at the 1000 mb level. The application of equations (33) and (35) makes it possible to pass from the barotropic model to the baroclinic one. *Subject Headings:* **1. Barotropic models 2. Numerical forecasting.**—*Author's abstract.*

8.3–155 551.511:532

Welander, Pierre (*Inst. of Met., Univ. of Stockholm*), **Studies on the general development of motion in a two-dimensional, ideal fluid.** *Tellus*, Stockholm, 7(2):141–156, May **1955.** 9 figs., 10 refs., 9 eqs. **DLC**—The purpose of this paper is to discuss qualitatively certain kinds of asymptotic motion in a two dimensional, ideal fluid by help of methods of statistical mechanics. It is stressed that the final development of such a fluid cannot be adequately described by use of the ordinary equations of motion, but that a "coarse grain" representation should be used. In this representation, the development is characterized by the forming of a single, large vortex accompanied by a certain non-viscous dissipation. The final equilibrium is probably reached almost explosively after a *finite* time. Some experiments which are carried out seem to support this result. In the earlier stages of development we may expect to have some kind of a quasi-equilibrium motion. It is attempted to find conditions under

vhich such a motion can exist, by studies of a point-vortex model. *Subject Headings:* **1. Fluid notion 2. Deformation fields 3. Statistical mechanics.**—*Author's abstract.*

GENERAL CIRCULATION

See also: **Barotropic model of atmosphere** (Vitek), 8.3–154; **Upper air circulation** (Pant), 8.3–229; **Mountain wave—Jet Stream Project** (Klieforth), 8.3–235.

8.3–156 551.513

Tomashenko, Roman, **Korreliatsiia mezhdu indeksami tsirkuliatsii na urovne moria i na overkhnosti 700 mb.** [Correlation between circulation indexes at sea level and at a 700 mb urface.] *Acta Geophysica Polonica*, Warsaw, 4(1):52–55, **1956.** 2 figs., table, 4 refs. Polish ummary p. 55. **DWB, DLC**—A definite correlation (90%) between variations of the sea level nd 700 mb circulation indexes for 40° to 60°N and 40°W to 40°E (for daily and five-day ıean values) is shown by the author on the basis of calculations made for a period of 26 months 9 winter; 6 spring; 6 summer and 5 autumn months). As an example, the author presents in graphs and tables) the variation of zonal indexes in winter 1953/1954, and discusses the rop of the correlation coefficient in March 1955, when a Siberian anticyclone prevailed. *ubject Headings:* **1. Circulation indexes 2. Zonal index 3. Correlation coefficients.**—*A.M.P.*

8.3–157 551.513.1:551.510.41:551.571

Brewer, A. W. (*Clarendon Lab., Oxford*), **The variations of ozone and water vapour concentrations. The value of observations.** *International Union of Geodesy and Geophysics. ssociation of Meteorology, Brussels, 1951, Procès-Verbaux des séances. Mémoires et discussion*, . 338–345, **1953.** 3 figs. **DWB**—Shows how knowledge about the general stratospheric irculation and its interaction with the troposphere could be obtained by the measurement of he average vertical ozone and water vapor profiles up to 25 km at all latitudes. Three cases re discussed: a) no mean circulation b) a single mean circulation with a stratospheric move- ıent towards the poles, and c) a double mean circulation meeting at the equatorial tropopause. *ubject Headings:* **1. Atmospheric circulation 2. Ozone concentration 3. Water vapor rofiles.**—*A.A.*

8.3–158 551.513.1:551.586:551.481.1

Simojoki, Heikki (*Inst. of Marine Research, Helsinki*), **Long rhythmic water level variaons in Lake Saimaa compared with the fluctuations in some climatological elements.** *Geohysica*, Helsinki, 5(2):107–112, **1956.** 2 figs., 3 refs., table. **DLC**—Water levels at Lake aimaa, annual precipitation at Helsinki and Uppsala, temperature at Helsinki, and pressure ifference between Copenhagen and Stykkisholm (Zonal index) are analyzed harmonically nd by the "frequency method" for period 1829 (temp.) or 1847 (other elements) to 1953, nd the results are tabulated and shown graphically. Although no predictable cycle was found, n apparent "rhythm" of about 30 years, and a parallel course between water levels on Lake aimaa and precipitation variations at Helsinki from 1890 was noted. Helsinki temperature hows a marked upward trend since 1880. Precipitation at Uppsala did not agree very well ith Helsinki precipitation or with lake levels. *Subject Headings:* **1. Lake level variations . General circulation rhythms 3. Lake Saimaa, Finland.**—*M.R.*

8.3–159 551.513.1:551.571

Starr, Victor P. (*M.I.T.*) and White, Robert M. (*A.F. Cambridge Res. Center, Mass.*), **)irect measurement of the hemispheric poleward flux of water vapor.** *Journal of Marine Research*, New Haven, Conn., 14(3):217–225, **1955.** 2 figs., 3 tables, 8 refs., eq. **DWB,)LC**—The average meridional flux of water vapor in the atmosphere is evaluated for the Northern Hemisphere from suitably distributed daily observations of wind and moisture uring the year 1950. Zonal averages for five latitude circles are presented, and these are ompared with the corresponding requirements calculated from estimates of zonally averaged recipitation and evaporation given in climatological literature. Considering the nature and cope of the work, the extent of the agreement obtained is considered noteworthy. *Subject Heading:* **1. Meridional water vapor flux.**—*Authors' abstract.*

8.3–160 551.513.2:551.557(235.2

Koo, Chen-Chao, **A Tibeti-fennsík dinamikus hatása a keletázsiai légkörzésre.** [Dy namic effect of the Tibet plateau on the atmospheric circulation over East Asia.] *Időjárás* Budapest, 59(4):204–211, July/Aug. **1955.** 13 figs., 16 refs. Russian and English summarie p. 204. **DWB, DLC.** Also complete German version as: **Der dynamische Einfluss de Hochlandes von Tibet auf die ostasiatische Zirkulation.** *Acta Agronomica*, Budapest, 5(1/2) 273–284, **1955.** Russian and English summaries p. 284. **DA**—Owing to the size of its are the Tibetan Plateau is bound to exert a significant effect upon the atmospheric circulation since extending over more than 1,500 km in width, it blocks the lower third or half of th troposphere. The dynamical effects to be attributed to the plateau manifest themselves in th following phenomena: in the winter season the jet stream branches off at the western side o the plateau, one branch proceeding north, the other south of it, to reunite behind the mountai region. In the summer season, from mid-May to mid-October, there is only the northern branch left, the summer monsoon penetrating as far as the southern side of the plateau. Whil passing over the plateau the baric formations subside. On the eastern side of the platea a dead space forms, characterized by strong inversion. *Subject Headings:* **1. Atmospheri circulation 2. Jet stream variation 3. Mountain effects 4. Tibet.**—*Author's abstract.*

8.3–161 551.513.7:551.58

Saito, T., **Preliminary study of blocking in the Far East.** *Journal of Meteorological Re search*, Tokyo, 7(2):81–83, March **1955.** 2 figs., 3 refs. In Japanese; English summary p. 81 **DWB**—Relations between blocking action and climate in the Far East are discussed. As a result, the author shows that the "blocking-action index" after D. Elliot and B. Smith i useful for examination of blocking action in the Far East and that the retardation of zona westerly index corresponding to blocking wave can be detected by the analysis of observationa data. *Subject Headings:* **1. Blocking action 2. Climate of the Far East 3. Far East.**—*Author' abstract.*

ATMOSPHERIC DISTURBANCES

See also: **Summer low, synoptic behavior** (Moriarty), 8.3–22; **Locating thunderstorm centers** (Perlat), 8.3–98; **Low latitude numerical prediction . . .** (Jordan), 8.3–123; **kinematic analysis, upper wind fields** (Mulky), 8.3–124; **Air movement . . .** (Vuorela), 8.3–125; **Prediction of cyclone intensity . . .** (George, Wolff), 8.3–126; **Trade winds** (Malkus), 8.3–221; **Atmospheric small-ion contents at Kakioka** (Kikuchi), 8.3–330; bibliog. on **Specialized Forecasting,** p. 372–401.

8.3–162 551.515.2

§Chapman, William T., Jr. and Sloan, Young T. (*both, National Weather Analysis Center U. S. W. B. Wash., D. C.*), **Paths of hurricanes Connie and Diane.** *Monthly Weather Review* Wash., D. C., 83(8):171–180, Aug. **1955.** 13 figs., table, 9 refs. **DWB**—The authors describe the surface synoptic features associated with the hurricanes "Connie" and "Diane" and examine the applicability of Simpson's warm tongue technique and Riehl and Haggard's computation and high level steering to predict the 24-hour movement of hurricanes. *Subject Headings* **1. Synoptic studies 2. Hurricane analysis 3. Hurricane "Connie" (1955) 4. Hurricane "Diane" (1955).**—*I.L.D.*

8.3–163 551.515.2:551.509.52

§U. S. Bureau of Aeronautics (Navy), **Prediction of tropical cyclone tracks.** Project AROWA (TED-UNL-MA-501.12), Second Research Report [1955?]. 40 p. 12 figs., 2 refs.—In attempt to remove the element of qualitative judgment from hurricane displacement forecasts, a more objective method was set up to be tested during the 1955 hurricane season than was used in 1954. Data for Atlantic for 1954 and data for Pacific for 1950–1954 were used in tests. A smaller grid (15°×15°) proved more satisfactory since it embraced fewer extraneous occurrences. The 500 mb level was chosen as the most convenient which would approximate the steering level. Scatter diagrams were prepared for 50 cases of calculated vs. observed meridional displacement with a 1° scatter band for the regression line, and the same for zonal displacement. Very few points lie outside these bands. Statistical

nd operational procedures are set forth and illustrated, and examples of use given for hurri-nes of Aug. 29, and Sept. 10, 1954. *Subject Heading:* **1. Hurricane diplacement forecasts.** *-M.R.*

8.3–164 551.515.23(74)

Davis, Walter R. (*W. B. Office, Miami*), **Hurricanes of 1954.** *Monthly Weather Review*, Vash., D. C., 82(2):370–373, Dec. **1954.** fig., 6 refs. Also: Dunn, Gordon, E.; Davis, Valter R. and Moore, Paul L., **Addendum** to **"Hurricanes of 1954."** *Ibid.*, 83(12):314, ec. **1955.** fig. **DWB**—The 1954 hurricane season was distinguished by pronounced meri-onal circulation, by the hurricanes recurving northward at low latitudes, by the absence of opical storms in Florida, Georgia and the Gulf States and the passage of three hurricanes rough the North Atlantic States and New England. The histories of the individual hurri-nes Alice, Barbara, Carol, Dolly, Edna, Florence and Hazel are described in detail and a ap showing the track of the 1954 hurricanes is presented. In the Addendum, the track of a rricane in mid-Atlantic, that occurred from Sept. 30–Oct. 5, 1954, but which was not in-uded in list of 1954 because it was unnamed, is shown on a large chart. *Subject Headings:* **Hurricanes, 1954 2. Meridional circulation 3. Hurricane tracks 4. New England.**—*L.D., M.R.*

8.3–165 551.515.31:551.509.317

§Beebe, Robert G. (*Severe Local Storms Forecast Center, U. S. W. B., Kansas City, Mo.*), **rnado composite charts.** *Monthly Weather Review*, Wash., D. C., 84(4):127–142, April, **956.** 8 weather charts, table, 4 refs. **DWB, DLC**—Composite charts of height (or sea level ressure), temperature, and dew point were prepared for the surface, 850-, 700-, and 500-mb vels for tornado occurrences in 6 different areas in the United States. Cases selected for clusion in these composite charts were mostly based upon the occurrence of 3 or more rnadoes within any one of the 6 areas during a 12-hour period. The number of cases ranged om 17 to 66 in any one area with a total of 229 cases. These charts present a mean picture synoptic conditions from 0 to 12 hours before the outbreak of tornadoes for each of the 6 eas. In spite of seasonal and geographical differences in data, the similarity of patterns is riking. *Subject Headings:* **1. Synoptic conditions for tornadoes 2. Tornado forecasting.**—*uthor's abstract.*

8.3–166 551.515.31:551.509.318

§Hanks, Howard H., Jr. and Neubrand, Georgina M. (*both, Severe Local Storms Forecast nter, U. S. W. B., Kansas City, Mo.*), **Tornadoes of April 2 and 3, 1956.** *Monthly Weather eview*, Wash., D. C., 84(4):155–162, April **1956.** 8 charts, 3 refs. **DWB, DLC**—A discussion the synoptic situation leading to the occurrence of tornadoes on April 2 and 3 in the mid-est (Wisconsin, Mich., Ill., Ind., Ky., Tenn., Ark., Miss. and Kansas) is presented. It is und that approximately the same instability and low-level moisture conditions existed on pril 1, 2, and 3. Reasoning from the vorticity equation and upper-level charts suggests that strong vertical motion field was the significant factor present on April 2 and 3, which was ot present on April 1, a day without tornadoes. *Subject Headings:* **1. Synoptic conditions r tornadoes 2. Tornado forecasting.**—*Authors' abstract.*

8.3–167 551.515.31 532.5

Long, Robert R., **Sources and sinks at the axis of a rotating liquid.** Johns Hopkins Univ. ept. of Civil Engineering, Contract N-onr-248(31), Project NR 082-104, Technical Report, o. 5, June **1955.** 15 p. 8 figs., 4 refs., 16 eqs. **DWB**—A solution is obtained for the flow a rotating, frictionless, incompressible fluid due to a strong source or sink at the axis of tation. The type of motion is controlled by the value of the Rossby number, Ro, a ratio inertial and Coriolis forces. The solution resembles potential flow if Ro is very large. Ro decreases the sink draws more and more from the axis of rotation until, at Ro=0.261, e fluid approaches the sink in a jet centered at the axis and with a radius about half that of the linder. No solution is obtained for smaller values of Ro. If a jet is postulated for small lues of Ro, it is shown that its radius decreases as the cube root of the flux. Several experi-

mental photographs are shown. They contain some of the features of the theory. The jet type of motion becomes very pronounced for weak sinks. *Subject Headings:* **1. Hydrodynamics 2. Vortex dynamics.**—*Author's abstract.*

8.3–168 551.515.31:551.541

Tepper, Morris and Eggert, William E. (*both, U. S. W. B., Wash., D. C.*), **Tornado proximity traces.** *American Meteorological Society, Bulletin*, 37(4):152–159, April **1956.** 4 figs., table, 11 refs. **DWB, DLC**—Pressure, temperature, and relative humidity traces obtained from regular reporting and special network surface stations in operation in Midwestern United States during the years 1951 through 1954 and located within 15 miles of a tornado are presented. It is noted from plots of the location of the stations with respect to the tornado that certain characteristics are suggested by the barograms, dependent primarily on the distance of the instrument from the tornado. Some relationships are also inferred between microcyclones and tornadoes, and between pressure jump lines and tornadoes. The available hygrothermograph traces show many instances of the drop in temperature and rise in relative humidity usually associated with the passage of a squall or pressure jump line. Plot of the pressure fall *vs.* distance from the tornado suggests a $(\Delta p)^2 r = \text{constant}$ law for a "tornado-bearing microcyclone." Finally, a suggestion is made that some tornadoes may form as a result of some interaction between a pressure jump line and a microcyclone. *Subject Headings:* **1. Tornado structure 2. Pressure jump theory.**—*Authors' abstract.*

8.3–169 551.515.8:551.553.12:551.588.2

Wilkins, Eugene M. (*U. S. W. B., Wash., D. C.*), **Discontinuity surface produced by topographic winds over the upper Snake River Plain, Idaho.** *American Meteorological Society, Bulletin*, 36(8):397–408, Oct. **1955.** 12 figs. (incl. photos), 3 refs. **DWB**—Eastern Idaho's Snake River Plain and that portion of the Continental Divide bordering it to the north comprise a topographic feature that provides an interesting local wind phenomenon. A sloping discontinuity surface is produced in a zone of conflict between slope and valley winds. The incursions of the front at the National Reactor Testing Station have become the subject of investigation because of their effect on the dispersion of stack effluents. Photographs are presented showing the effect of the frontal shear on a stack plume, smoke released at the ground, and a debris cloud from an experimental explosion. These photographs give an indication of the circulation pattern in the vicinity of the front. In addition, data from a network of recording stations, instruments on a 250-ft tower, and low-level wind and temperature soundings have been used to establish the circulation model. Information is presented to show seasonal and diurnal effects, and also the influence of major pressure systems on the front phenomenon. *Subject Headings:* **1. Discontinuity surfaces 2. Topographic influences 3. Valley winds 4. Snake River Plain, Idaho.**—*Author's abstract.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Biological effects of cosmic rays** (Giordano), 8.3–89; **Protection of humans from . . . cosmic radiation . . .** (Schaefer), 8.3–90; **Balloon-borne system for tracking sun** (Edwards), 8.3–107; **Narrow pass band albedometer** (Asburn et al.), 8.3–113; **Infrared radiation detection and measurement** (Smith), 8.3–114; **Solar x-ray spectrum . . .** (Byram), 8.3–148; **Skylight and atmospheric turbidity** (Volz), 8.3–321; **Radio polarization data Faraday rotation** (Cohen), 8.3–344.

8.3–170 551.521.16:535.34:551.463

Ivanoff, Alexandre (*Ecole Supérieure de Physique et de Chimie Industrielles*), **Étude de pénétration de la lumière dans la mer.** [Study of the penetration of light in the sea.] *Annales de Géophysique*, Paris, 12(1):32–44, Jan./March **1956.** 9 figs. (incl. photos), 4 refs., eqs. English summary p. 32. **DLC**—Proceedings are given of measurements concerning the extinction coefficient of sea water and the ratio of the light scattered upward to the light

ransmitted downward. The observations have been carried out by the author in Villefranche-ur-Mer bay, using a spectrograph operated in a self-contained underwater equipment. A ıethod is developed allowing an estimate of the total absorption coefficient of sea water from he extinction coefficient in various depths. *Subject Heading:* **1. Light transmission by sea vater.**—*Author's abstract.*

8.3–171 535.5:551.521.16:551.463

Ivanoff, Alexandre, **Facteur de polarisation du résidu sous-marin de lumière du jour.** [Degree of polarization of residual submarine daylight.] *Annales de Géophysique*, Paris, 2(1):45–56, Jan./March **1956.** 9 figs. (incl. photos), tables, 7 refs., eqs. English summary . 45. **DLC**—Early measurements concerning the degree of polarization of submarine day-ight have been carried out photographically by the author in Villefranche-sur-Mer bay, 20 m leep, within a self-contained underwater breathing equipment, after an estimate of the con-rast of the interference pattern given by a Savart plate. The percentage polarization was ound to be on average of 10 vertically upward, 15 horizontally face to the sun, 30 horizontally ack to the sun and 35 horizontally at right angle to the sun. The accuracy is about 20%. *Subject Heading:* **1. Polarization of submarine daylight.**—*Author's abstract.*

8.3–172 551.521.31:551.575.1

Lenoble, Jacqueline, **Sur une application de la méthode de Chandrasekhar à l'étude du ayonnement diffusé dans des couches de brume.** [Application of Chandrasekhar's method o the analysis of diffused radiation in fog layers.] *Académie des Sciences, Paris, Comptes Rendus*, 241(6):567–569, Aug. 8, **1955.** 2 figs., 2 refs., 2 eqs. **DLC**—S. CHANDRASEKHAR ıas recently developed a method for calculating radiation propagation in a plane homogeneous liffusing medium. This approximation method has been well received by astrophysicists ıut has not been extended to the analysis of visibility in a medium consisting of large particles, uch as fog or the sea. The author applies CHANDRASEKHAR's formulas to: 1) a layer of given ptical thickness over a black surface illuminated solely by a uniformly luminescent sky, nd 2) an infinite layer illuminated by the sun. The numerical results obtained are in good eneral agreement with those obtained by OLIVIER and KUNTZMANN who used the diffusion ndex of GUMBRECHT. *Subject Headings:* **1. Diffuse radiation in fog 2. Diffusion formulas.** *—G.T.*

8.3–173 551.521.61:551.521.31

†Plass, Gilbert N., **Infrared radiation in the atmosphere.** *American Journal of Physics*, N. Y., 24(5):303–321, May **1956.** 14 figs., table, 28 foot-refs., 36 eqs. **DLC**—The infrared adiation flux in the atmosphere is determined by the distribution of three gases—water vapor, arbon dioxide, and ozone. The general equations for the transfer of radiation in a gas are lerived. These equations are solved for four simple model atmospheres that illustrate various eatures of the more complicated results for the earth's atmosphere. The atmospheric infrared adiation flux can be calculated from laboratory absorption measurements. The results of uch calculations are discussed in detail for the frequency ranges that are influenced by the arbon dioxide and ozone bands. *Subject Heading:* **1. Infrared radiation flux.**—*Author's bstract.*

8.3–174 551.521.63:551.593.53

Deirmendjian, Diran and Sekera, Zdenek (*both, Univ. of Calif.*), **Atmospheric turbidity nd the transmission of ultraviolet sunlight.** *Optical Society of America, Journal*, 46(8):565–71, Aug. **1956.** 3 figs., 3 tables, 27 foot-refs., 9 eqs. **DWB, DLC**—Recent determinations f the solar ultraviolet spectrum made by various authors are examined and an attempt is made o explain the high transmission values found by some of these in terms of the forward scatter-ng characteristic of Mie particles of a moderate refractive index. The Bouguer-Langley nethod used heretofore in the reduction of data, is shown to be more or less inaccurate in the letermination of the solar ultraviolet from ground stations. It is claimed that the nature and uantity of some aerosol components can be successfully investigated by means of solar pectrophotometry provided the difference between the "observed" and theoretical optical

thickness is carefully analyzed in terms of the scattering by Mie particles and other nor Rayleigh scatterers permanently present in the atmosphere. *Subject Headings:* **1. Turbidit factor 2. Ultraviolet radiation 3. Mie particles.**—*Authors' abstract.*

8.3–175 551.521.6

Iatsula, G. S. (*Kiev Med. Inst.*), **Ultrafioletovaia radiatsiia v Kieve i ee gigienicheskai kharakteristika.** [Ultraviolet radiation in Kiev and its hygienic characteristics.] *Gigiena Sanitariia*, Moscow, No. 8:46–48, Aug. **1955.** 2 figs. **DLC**—The annual variation of ultra violet radiation was studied with the aid of the oxalic acid method. Graphs show the dail amounts of ultraviolet radiation on cloud-free days and the mean hourly intensity of ultra violet radiation on cloud-free days in five day intervals. Numerical data are given in the text *Subject Headings:* **1. Annual ultraviolet radiation variations 2. Kiev, U.S.S.R.**—*I.L.D.*

8.3–176 551.521.63:551.4

Lenoble, Jacqueline, **Sur quelques nouvelles mesures de la pénétration du rayonnemen ultraviolet dans la Méditerranée et leur interprétation théorique.** [Some new measurement of ultraviolet radiation penetration in the Mediterranean Sea and their theoretical interpreta tion.] *Académie des Sciences, Paris, Comptes Rendus*, 241(20):1407–1409, Nov. 14, 1955 3 tables, 2 refs. **DLC**—Results of radiation penetration measurements made near Monac (Sept. 1–13, 1955) are tabulated. The factors measured were downward radiation, horizonta diffuse radiation and upward diffuse radiation at various wavelengths between 3185 and 4130 Å The values obtained are in good agreement with results of the previous years and confirm th author's theory which assumes, beyond a certain depth, a state of equilibrium in which th spatial distribution of luminosity remains constant and its amount decreases exponentially *Subject Headings:* **1. Ultraviolet radiation penetration into water 2. Radiation measurement 3. Mediterranean Sea.**—*G.T.*

8.3–177 551.521.6

Liana, Franciszek, **Pomiary promieniowania nadfiołkowego w Zakopanem i na Kas prowym Wierchu.** [Measurements of the ultraviolet radiation at Zakopane and at Kasprowy Wierch.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 8(3/4):225–226, **1955.** 4 tables **DWB, DLC**—The measurements were made in 1938 and 1939 at Zakopane and Kasprowy Wierch in the Tatra Mountains with bioclimatological dosimeters of I. G. Farbenindustri make. The range of measurements included ultraviolet radiation from 3200Å (maximum sensitivity of the instrument is about 2970Å and a 50% sensitivity at 2400Å), thus embracing a part of ultraviolet radiation which has an antirachitic and bactericidal effect. Accompanying tables show the maximum and minimum values obtained in relative units. A comparison o mean radiation intensity values in June and July at Zakopane and Obersdorf, a resort in the Allgäu Alps at 815 m altitude, show that the intensity of ultraviolet radiation at Obersdorf is 100% higher than at Zakopane. This is explained, according to the author, by the fact tha the Zakopane meteorological station is located in the center of the city, full of dust and smoke *Subject Headings:* **1. Ultraviolet radiation measurements 2. Radiation intensities 3. Zako pane, Poland 4. Kasprowy Wierch, Poland.**—*A.M.P.*

8.3–178 551.521.63:535.33:546.1

Wilkinson, P. G. (*Dept. of Physics, Univ. of Chicago*), **The far ultraviolet (*C-X*) bands of N_2^+.** *Canadian Journal of Physics*, Ottawa, 34(3):250–255, March **1956.** 3 figs., 3 tables 17 refs. **DWB, DLC**—Emission bands of the N_2^+ *C-X* system in the vacuum ultraviole have been obtained under high resolution. The rotational analysis confirms the assignment as a $^2\Sigma\mu^+ \rightarrow {}^2\Sigma_g^+$ transition and the rotational constants obtained are in substantial agreement with previous investigations. The unusual intensity distribution in the $v'=3$ progression and perturbations in the $v'=0$, 1, and 2 levels of the *C* state are in agreement with the theory o inverse predissociation in the $v'=3$ level. *Subject Headings:* **1. Ultraviolet spectrum 2. Nitrogen spectra.**—*Author's abstract.*

8.3–179 551.521.63:535.33:546.294

Wilkinson, P. G. (*Dept. of Physics, Univ. of Chicago*), **New krypton light source for the acuum ultraviolet.** *Optical Society of America, Journal*, 45(12):1044–1046, Dec. **1955.** figs., table, 7 foot-refs. **DWB, DLC**—A new vacuum ultraviolet light source is described hich emits a continuous spectrum from 1250 to 1650 Å. The electrodeless source, charged ith 190 mm of krypton, is operated with microwave power at 2450 Mc/sec, and is completely aled off from the pumping system. It has been used with a 21 ft vacuum spectrograph to hotograph the absorption spectrum of benzene vapor in the 1350 to 1550 Å region. *Subject eadings:* **1. Ultraviolet spectrographs 2. Krypton spectrograph.**—*Author's abstract.*

8.3–180 551.521.64:621.396.8

Aarons, Jules and Barron, William R., **Sudden absorption of atmospherics due to increase cosmic ray intensity.** *Nature*, London, 178(4527):277–278, Aug. 4, **1956.** fig., 4 refs. **WB**—Atmospheric noise recorded at Scituate, Mass., showed a sudden decrease at 0344 U.T. n Feb. 23, 1956, 4 min after a S.I.D. As the decrease occurred at night it is attributed to a smic ray increase. Noise returned to pre-absorption level at 0830 U.T. *Subject Headings:* **Radio noise 2. Cosmic ray effects.**—*C.E.P.B.*

8.3–181 551.521.64:519.2

Broadbent, S. R., **A measure of dispersion applied to cosmic-ray and other problems.** *ambridge Philosophical Society, Proceedings*, 52(3):499–513, July **1956.** fig., 5 tables, 15 refs., 5 eqs. **DLC**—The statistic $\Delta^2 = \sum_{ij=1}^{n} \{(x_i-x_j)^2+(y_i-y_j)^2\}/n(n-1)$ is applied in several ifferent situations to detect departure from uniform dispersion. The given sample points ay lie on a square lattice (without repetition), a rectangular lattice (repetition being allowed), r within rectangular or circular plane boundaries. The problems considered include an nalysis of cosmic ray shower structure, and the counting of dust particles and bacterial olonies. *Subject Headings:* **1. Cosmic ray showers 2. Statistical analysis.**—*Author's abstract.*

8.3–182 551.521.7:621.396.029.6 621.396.029.6:523.33

Sinton, William M. (*Johns Hopkins Univ.*), **Observations of solar and lunar radiation t 1.5 millimeters.** *Optical Society of America, Journal*, 45(11):975–979, Nov. **1955.** 7 figs., able, 7 refs. **DWB, DLC**—Observations of the radiation from the sun and the moon in a ide wavelength band centered approximately at 1.5 mm are reported. These waves were etected with a Golay detector using a searchlight mirror for a telescope. Measurements of tmospheric extinction are reported and compared with calculations of water vapor absorption hich have been made by J. H. Van Vleck. It is found that the measured extinction is reater than the calculated. Observations of the radiation emitted by the moon at different hases are reported. The transmittances of some materials to the 1.5-mm waves from the sun re included. *Subject Headings:* **1. Microwave transmission 2. Solar radio frequency radiation 3. Lunar ratio frequency radiation.**—*Author's abstract.*

AIR TEMPERATURE

See also: **Frost protection** (Germany. Deutscher Wetterdienst), 8.3–1; **Ultra-short wave distant reception . . .** (Klinker), 8.3–20; **Ambient conditions and plant diseases** (Bazande Segura), 8.3–81; **Degree of wintriness** (Kyriazopoulos), 8.3–100; **Air temperature, Kraków** (Milata), 8.3–101; **Thermal conditions . . .** (Péczely), 8.3–127; **Nightcooling . . .** (Richardson), 8.3–129; **Temp. profile in upper atmos.** (Sawada), 8.3–142; **Diurnal temp. pressure and isobaric surface height** (Maeda), 8.3–200; bibliog. **on Specialized Forecasting,** p. 372–401.

8.3–183 551.524.37(493)

*Vandenplas, A., **Les périodes de grands froids en Belgique, 1901–1954.** [Periods of ntense cold in Belgium, 1901–1954.] *Belgium. Institut Royal Météorologique, Publications, Ser. B*, No. 14, **1954.** 30 p. 7 figs., tables. **DWB**—The data on intense cold presented for different regions of Belgium are presented in tables and include the following: periods of

consecutive days of winter (with air temperature less than 0°C) giving maximum temperature date of beginning of period, duration, mean maximum and mean minimum daily temperatur of the period; period of severe frost (temperature less than −5°C) giving beginning an duration of period and minimum temperature; periods of very severe frosts (temperature les than −10°C) and periods of consecutive days of frost. *Subject Headings:* **1. Severe winter 2. Belgium.**—*I.L.D.*

8.3–184 551.524.371:632.111.

Baker, George Allen, Jr. (*Dept. of Physics, Univ. of Calif.*), **Mean airflow and heat transpor patterns generated by wind machines with applications to frost protection.** *American Geo physical Union, Transactions*, 36(6):954–962, Dec. **1955.** fig., 56 eqs., 7 refs. **DWB, DLC**— In this paper we develop theoretical flow patterns for idealization of several types of wind machine settings of particular interest in the field of the wind-machine protection of frui orchards from frost damage. We further develop from dimensional analysis and asymptoti considerations a semiempirical formula for the effective velocity of a turning jet. We comput the time of arrival of air from a turning jet and by considering its relation to the transport w establish a semi-empirical formula relating the thermal response (a measure of the heat trans ported) to the mean arrival time. *Subject Heading:* **1. Frost fan efficiency.**—*Author's abstract*

8.3–185 551.524.371:632.111.

†van Eimern, Josef, **Frostschutz mittels Propeller.** [Frost protection by means of fans.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(12), **1955.** 30 p. 13 figs., table, 20 refs **DWB**—The principles underlying the use of fans in frost prevention and the history of thei development and use in the U. S., England and Australia are reviewed. A detailed accoun is given of similar experiments carried out in Ottensen near Buxtehude during 1953 and 1954 The structure of the fan, the experimental field, the instrumentation and procedure are de scribed with the aid of diagrams and photographs. The influence of the fan upon wind fiel and temperature field is shown graphically and data of the maximum temperature effect ar given in tables. The size of the area influenced by the fan, the maximum reach of the fan the rise and fall of temperatures immediately after the turning on and off of the fan and th effect of oscillation of the fan are discussed with the aid of graphical representation of the tem perature data. *Subject Headings:* **1. Frost fans 2. Frost prevention.**—*I.L.D.*

8.3–186 551.524.4(439.1

Justyák, János and Emri, Miklós, **Különböző magasságban mért minimumok között összefüggések vizsgálata.** [Analysis of correlations between minimum values obtained a various heights.] *Időjárás*, Budapest, 59(6):381–383, Nov./Dec. **1955.** 2 figs., eqs. **DWB DLC**—Mean monthly minimum temperatures for Debrecen at 5 and 200 cm above the ground (1930–1952) are presented. Correlations between the 5–200 cm minimum temperature difference and wind and cloudiness conditions are analyzed, correlation coefficients of limited significance being found for certain months. *Subject Headings:* **1. Temperature-height correla tions 2. Debrecen, Hungary.**—*G.T.*

8.3–187 551.524.4:551.526.6:551.509.3

Yamaguchi, Toru, **A synoptic study on the utilization of marine observational data t weather forecasting.** *Oceanography and Meteorology*, Nagasaki, 6(2/4):137–140, Dec. **1954** 5 figs., 3 refs. In Japanese; English summary p. 208. **MH-BH**—The Eastern Sea observatio was made by the Tsuru-maru during the period from February 20 to March 4, 1952. The author computed the energy exchange between sea and atmosphere by using the data. It i indicated in section 1 that the amount of energy exchange is quite diverse according to the atmospheric conditions. The synoptic analysis in section 2 shows some relations betwee the energy exchange and the initial development of "Taiwan-Bozu," a cyclone generated north east of Formosa. *Subject Headings:* **1. Energy exchange sea-atmosphere 2. Synoptic marine data 3. Cyclone formation.**—*Author's abstract.*

8.3–188 551.524.4:551.584.31

Yoshino, Masatoshi (*Geog. Inst., Tokyo Univ. of Educ.*), **Maximum and minimum temperature of the slope on Mt. Neko, Nagano Prefecture, Pt. 1, Comparison of the diurnal change of air temperature in a small area (5th Report).** *Journal of Agricultural Meteorology*, Tokyo, 9(3/4):139–143, Aug. **1954.** 2 figs., 4 tables, 13 refs., eqs. In Japanese; English summary p. 143. **DWB**—The study of air temperature lapse rate on the mountain slope is of special interest for local climatological consideration. The data accumulated at the two climatological stations, located on the lower part of the southwestern slope of Mt. Neko, Nagano Prefecture, are used for the calculation of the air temperature lapse rate. The altitude of St. A above the sea level is 1395 m, St. B is 1280 m. Seasonal and annual mean of lapse rate of maximum and minimum temperature are shown in Table 1. A particularly important result is an inversion state of minimum temperature in the mean condition. In the case of the annual mean, the higher the altitude on the slope, the warmer the minimum temperature at a rate of 1.13°C/100 m. Then, to investigate the frequency and magnitude of lapse rate of maximum and minimum temperature in detail, a statistical method, calculation of probable ellipse, is applied for each season. As is shown in Fig. 2, spring and autumn have a greater major axis as a consequence of increased interdiurnal temperature variabilities in the respective seasons. The eccentricity, however, of the probable ellipse of maximum and minimum temperature (Table 3) change in parallel in spring, summer and autumn on the whole. As the minimum temperature in winter is most characteristic, its eccentricity in winter shows the special value. This is because of the strong winter inversion both in frequency (Table 4) and magnitude (1.6°C/100 m) caused by the effect of snow cover and the longer duration of nighttime. *Subject Headings:* **1. Diurnal temperature variations 2. Vertical temperature gradient 3. Slope climatology 4. Mt. Neko, Japan.**—*Author's abstract.*

8.3–189 551.524.7

*Apps, R. F. and Ying, Lo Yu, **Median and quartile upper air temperatures at given pressure levels at Hong Kong, 1949–1955.** *Hong Kong. Royal Observatory, Technical Note*, No. 12, Oct. **1955.** 2 p., fig., 12 tables, 2 refs. **DWB**—Report consists of monthly tables of median, upper and lower quartile temperature and geopotential (height) at the 1000, 900, 850, 800, 700, 600, 500, 400, 300, 200, 150, 100, 60 and 40 mb levels for observations made at Hong Kong from 1949–1955. curves show annual variation in median temperature at each level up to 100 mb. Since radiosonde temperature and pressure data are not corrected for radiation error (daytime) at high levels, these corrections are made on the temperature data before assigning to quartile. Pressure height is controlled by radar in recent years. *Subject Headings:* **1. Upper air temperature frequencies 2. Upper air geopotential 3. Radiation error in radiosonde observations 4. Hong Kong.**—*M.R.*

8.3–190 551.524.7:551.557

Kochanski, Adam (*Air Weather Service, Wash., D. C.*), **Horizontal temperature gradient at 200 mb and adjacent levels.** *American Meteorological Society, Bulletin*, 37(2):47–54, Feb. **1956.** 9 figs., 6 tables, 9 refs. **DWB, DLC**—Horizontal temperature gradients as large as 7°C per distance of one degree latitude are observed occasionally on 200 mb maps and (with a generally opposite direction) on 500 mb maps. These values are derived from gradient measurements in the vicinity of stations with temperature observations. Aircraft reports yield still higher horizontal gradients: 9°C to 11°C per 1 deg lat. An extreme temperature difference of 13°C over a distance of $\frac{1}{2}$° lat. appears feasible, based on extrapolation of differences found over greater distances. The last value is equivalent geostrophically to a vertical wind shear (allegedly observed by aircraft) of 60 kts/1000 ft. *Subject Headings:* **1. Upper air temperature gradients 2. Upper air wind shear.**—*Author's abstract.*

8.3–191 551.524.7:551.510.53

Zerinvári, Szilárd, **A sztratoszféra magassága és hőmérséklete.** [Height and temperature of the stratosphere.] *Időjárás*, Budapest, 58(5):308–314, Sept./Oct. **1954.** 8 figs., table, 2 eqs. **DWB**—Recent progress in the knowledge of stratospheric thermal conditions is reviewed. The role of carbon dioxide, ozone, water vapor, volcanic dust particles and con-

vective currents in the heat balance of the stratosphere is taken up. DOBSON, GOODY, STRONG-PLASS, CHACKETT-PANETH-WILSON, RAKIPOVA and KONDRATEV are among the authors whose findings are discussed. *Subject Headings:* **1. Stratospheric temperatures 2. Heat balance of stratosphere.**—*G.T.*

SOIL TEMPERATURE

8.3–192 551.525:016

†Crawford, Carl B., **Soil temperatures: a review of published records.** *National Research Council of Canada. Div. of Building Research, Research Paper*, No. 6; *NRC* No. 2785; *DBR* No. 32, [1952?]. Reprint from *National Research Council, Wash., D. C., Highway Research Board, 30th Annual Meeting, Jan. 1951, Frost action in Soils: a Symposium*, p. 17–40. 5 figs., 5 tables, 76 refs. **DWB**—This review of the literature on soil temperature and the thermal characteristics of soils is based entirely upon references published in English; indirect references are made to papers published in Germany and Scandinavia. After a brief summary of early studies, in the 17th and 18th centuries, on the action of frost on the ground and on soil temperature observations the author discusses the following: the economic importance of soil temperature studies, the effect upon soil temperature of topography, soil structure, rainfall and melting snow, snow cover, surface cover and soil moisture content, moisture movement, thermal conductivity and diffusivity of soil, freezing temperature of soils, daily temperature variation, temperature inversion with depth, and frost penetration and retreat. *Subject Headings:* **1. Soil temperatures 2. Soil heat conductivity 3. Soil freezing 4. Bibliography on soil temperature.**—*I.L.D.*

8.3–193 551.525:6

†Legget, Robert F. and Peckover, F. L., **Soil temperature studies: a progress report.** *National Research Council of Canada. Div. of Building Research, Research Paper*, No. 1, [1949?]. 20 refs., 7 figs. **DWB**. Reprint from *National Research Council, Washington, D. C., Highway Research Board, 29th Annual Meeting, Dec. 1949, Proceedings*, p. 434–445.—Depth to bury pipes, design of foundations, heat pump operation, heat losses from conduits and stability of highway and airport pavements depend on soil temperature in areas subject to frost. Experiments began in Canada in 1945 to study relation of soil types, compaction, etc. to temperature, frost, moisture migration in soil, and other important factors. Work done in Canada and elsewhere is reviewed. Relation of soil temperature to air temperature (Montreal), variations with depth by month and day to day, frost penetration, complicating factors, and work now in progress in Canada are treated descriptively with a few quantitative data presented in graphs. *Subject Headings:* **1. Soil temperature studies 2. Soil moisture movement 3. Industrial climatology 4. Frozen ground 5. Canada.**—*M.R.*

WATER TEMPERATURE

See also: **Utilization of marine obs. data to weather forecasting** (Yamaguchi), 8.3–187.

8.3–194 551.526.8:551.556

Einarsson, E., **The effect of wind on subsurface water temperatures in Thunder Bay. Canada.** *Meteorological Div., Cir.* 2687, Tec. 221; *Local Forecast Study*, No. 29, Winnipeg District, July 27, **1955.** 4 p. 2 figs., 3 refs. **DWB**—A study was undertaken to determine if the water temperature at an intake 40 feet below the surface of Thunder Bay, Lake Superior, was close enough to the surface water temperature for use on synoptic charts and in weather forecasting. Daily readings taken at Chippewa Park during June 25–July 16, 1954 were compared with intake temperatures at the Bare Point pumping station some distance away. Large fluctuations were noted in the Bare Point water temperatures; a difference of 19°F occurred on one day between Bare Point and Chippewa Park surface water. Low temperatures were connected with westerly winds on the succeeding day, and high temperatures with prevailing easterlies which pile up warm surface water in the Bay. Only the higher temperatures are considered representative. *Subject Headings:* **1. Lake temperatures 2. Wind effects on subsurface water temperatures 3. Thunder Bay, Lake Superior, Canada.**—*M.R.*

8.3–195 551.526.8(518):551.311.182

Murakami, Masatsugu, **Freezing of the Sunghali River, Manchuria.** *U. S. Snow, Ice and Permafrost Research Establishment, Translation*, No. 34, June **1955.** 12 p. 12 figs. (incl. photos), 4 tables. Transl. by Charles A. Meyer & Co., Inc., of original Japanese, **Shokako no toketsu,** in *Snow and Ice*, Tokyo, 3:333–342, **1941.**—The author describes the ice condition of the river from freezing to thawing, the characteristics and occurrence of drift ice, growth of surface ice including thickness of ice formed per day, thickness of ice and rate of formation and effect of rate of flow on the thickness and fluctuations of water and ice levels. Tables containing data on thawing and beginning of drift over freezing water, daily maximum and minimum air temperature, water temperature and ice thickness, maximum daily increase of thickness are presented. *Subject Headings:* **1. Freezing of rivers 2. River temperatures 3. Sungari River, Manchuria.**—*I.L.D.*

PRESSURE AND WIND

PRESSURE

See also: **Conditional minimal flight paths** (Gringorten), 8.3–78; **Altitude design corrections** (Vinson), 8.3–87; **Forecast height changes . . .** (Berkofsky), 8.3–93; **Supersonic wind-tunnel measurements . . .** (Sweeney), 8.3–109; **Atmos. lunar tides . . .** (Sawada), 8.3–142; **Vorticities computed from geostrophic and observed winds** (Peterson), 8.3–152; **Ageostrophic vorticity** (Vítek), 8.3–153; **Water level variations in Lake Saimaa** (Simojoki), 8.3–158; **Tornado proximity traces** (Tepper), 8.3–168; **Ageostrophic wind component** (Brandejs), 8.3–207; **Soil-atmos. interaction** (Fukuda), 8.3–208; **Pressure and surface winds over Atlantic between Labrador and Greenland** (Potter), 8.3–218.

8.3–196 551.541:551.558.21

Wurtele, M. G., **Studies of lee waves in atmospheric models with continuously distributed static stability.** California. Univ. at L.A. Dept. of Meteorology, Contract AF 19(122)-263, Scientific Report, No. 4, June **1953.** 10 p. 5 figs., 9 refs., 14 eqs. **MH-BH**—The theory of Couette flow with internal stability is analyzed in regard to mountain waves. One of the important results is that the shorter waves die out with elevation, and the longest excited wave predominates above a certain height. The effect of the tropopause is discussed. The origination of lee waves is closely related to tropospheric stability. For weaker stability the range of shear, for which lee waves are possible, is small. This result is supported by the experience of observers. *Subject Headings:* **1. Lee waves 2. Tropopause 3. Tropospheric stability 4. Sierra Nevada, Calif.**—*A.A.*

8.3–197 551.541:551.558.21

Wurtele, M. G. (*M.I.T.*), **The transient development of a lee wave.** *Journal of Marine Research*, New Haven, Conn., 14(1):1–13, **1955.** 6 figs., 10 refs., eqs. **DWB, DLC**—A stream with an initially undisturbed free surface is set impulsively in motion and a (small) pressure perturbation is applied to the surface. The form of the free surface as a function of time is examined in detail up to the point where the disturbance is sensibly that of a steady-state lee wave. *Subject Heading:* **1. Lee wave development.**—*Author's abstract.*

8.3–198 551.543

Espenskiĭ, B. D., **Teoriia lokal'nykh izmeneniĭ prizemnogo davleniia.** [Theory of the local pressure variations near the ground.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:3–7, Jan./Feb. **1955.** ref., 13 eqs. **DWB**—The author develops an equation expressing the factors involved in pressure changes at the surface. It indicates that the turbulent and thermally produced pressure changes do not suffice to explain the surface pressure field since the divergence constituents play a considerable role in these processes. *Subject Headings:* **1. Pressure variations 2. Surface pressure field.**—*I.L.D.*

8.3–199 551.543.1 551.5:519.2

*Holloway, Leith; Holt, Anatol W.; Mauchly, John W. and Woodbury, Max A., **Topics in statistical meteorology.** Pennsylvania. Univ. Institute for Cooperative Research, Contract Nonr 551 (07) (NR 082-113), Final Report of the Meteorological Statistics Project, June 1955. 23 p. 4 tables, 6 refs. **DWB**—Abstracts of previous technical reports (No. 1 & 2) of the project are followed by a summary of information found in pressure patterns by factor analysis; distribution of information estimates; and a study of amplitude variations in the 12-hour pressure and temperature oscillations at Batavia. *Subject Headings:* **1. Statistics in meteorology 2. High speed computers 3. Semidiurnal pressure oscillations 4. Batavia, Java.**—*M.R.*

8.3–200 551.543.1:551.524.7(52)

Maeda, K., **Harmonic analysis of the diurnal variation of temperature, pressure and height of isobaric surface in the atmosphere.** *Journal of Meteorological Research*, Tokyo, 5(8):669–679, Sept. **1953.** 17 figs., 2 tables, 9 refs. In Japanese; English summary p. 669. **DWB**—The data on diurnal variations in temperature and pressure in the atmosphere at the Aerological Observatory, Tateno, are treated with the following formula:

$$A(t) = A_0 + A_1 \sin(t + \phi_1) + A_2 \sin(2t + \phi_2).$$

The altitude dependence of these amplitudes and phase angles is compared with that of San Juan as computed by B. Haurwitz in 1944. Moreover, the diurnal variation of the height of several isobaric-surfaces is calculated and analysed similarly. There is no remarkable difference between the results of Tateno and San Juan except the altitude variation of the second harmonics of the diurnal variation of barometric pressure. *Subject Headings:* **1. Diurnal temperature variations 2. Diurnal pressure variations 3. Harmonic analysis 4. Isobaric surfaces 5. Tateno, Japan.**—*Author's abstract.*

8.3–201 551.543.21:551.464:541.8

Carritt, Dayton E., **Atmospheric pressure changes and gas solubility.** *Deep-Sea Research*, London, 2(1):59–62, Oct. **1954.** fig., 3 refs. **DWB**—The calculation of percent saturation, and similar quantities, for oxygen and nitrogen dissolved in sea water is done under the assumption that the gases were dissolved from a normal atmosphere with a pressure of 760 mm Hg. It is pointed out that the seasonal changes in atmospheric pressure that occur over the ocean surface are sufficient to impart measurable changes in gas solubility, being approximately 0.3 ml/l for oxygen and 0.6 ml/l for nitrogen. The possibility of using the nitrogen change as a seasonal tag is mentioned. *Subject Headings:* **1. Sea water composition 2. Gas exchange sea-atmosphere 3. Atmospheric pressure effects.**—*Author's abstract.*

8.3–202 551.547:518.5:517.512

Bryson, Reid A. and Kuhn, Peter M., **Half-hemispheric 500 mb topography description by means of orthogonal polynomials, Pt. 1, Computation.** Wisconsin. Univ. Dept. of Meteorology, Contract AF 19(604)-992, Scientific Report, No. 4, Feb. **1956.** 16 p. 2 figs., tables, 8 refs., 16 eqs. **DWB**—High speed computing techniques employing the magnetic drum digital computer at the Univ. of Wisconsin make feasible the use of an objective topography description of the 500 mb and other surfaces. Contours over the half hemisphere bounded by 0°W, 10°N, 180°W and 70°N are fitted by a combination of 22 Chebyshev orthogonal polynomials. The coefficients of the polynomials provide an objective means of classifying the broad scale features of the circulation pattern into a synoptic climatology. The value of these 22 coefficients is enhanced greatly by the elimination of the mean annual chart and hence the large coefficient of the linear polynomial in the north-south direction which persists from day to day. The nature of these polynomials permits rapid calculation of charts of various derived quantities. *Subject Headings:* **1. Upper air topography 2. Pressure distribution analysis 3. Mathematical techniques.**—*Authors' abstract.*

8.3–203 551.547(93/4)

Porter, Elizabeth M., **Mean heights of the standard isobaric surfaces in the Australasian Region.** *New Zealand. Meteorological Service, Technical Note*, No. 105, Dec. 17, **1953.** 10 p.

19 charts, 3 refs. **DWB**—Charts of the mean heights of the 700, 500, 300, 200 and 100 mb surfaces over the Australia-New Zealand region in Jan., April, July and Oct. are reproduced. *Subject Headings:* **1. Upper air pressure 2. Australasia.**—*Author's abstract.*

8.3–204 551.547:551.509.317

Zikmunda, Otakar (*Charles Univ., Prague*), **Souvislost medzi změnami přízemního tlaku, výšky isobarické plochy 500 mb a tloušťky relativní topografie 1000–500 mb.** [Relation between the changes of surface pressure, the height of the 500 mb surface and the thickness of the 1000–500 mb relative topography.] *Meteorologické Zprávy*, Prague, 9(1):1–5, **1956.** 8 tables, 9 refs., 8 eqs. Russian and German summaries p. 1. **DWB**—Data on correlations between variations of the 1000 and 500 mb levels, and between variations of the 1000 mb level and the 1000–500 mb relative topography are presented for Prague for the years 1951–1952. For a selected synoptic situation advective and nonadvective changes of the relative topography are correlated with variations of the 1000 mb level. For WIPPERMANN's types of pressure changes the frequency of precipitation occurrence and the average sunshine duration are determined. A verification of FICKER's rules shows that only some of them are usefully applicable to 24-hour forecasts based on measurements in the free atmosphere. *Subject Headings:* **1. Relative topography 2. Pressure changes 3. Pressure correlations 4. Prague, Czechoslovakia.**—*Trans. of author's abstract.*

8.3–205 551.547.1

Brandejs, Stanislav (*Inst. of Met. & Climatology, Charles Univ.*), **Equation of the tendency of the absolute topography of isobaric planes.** Translation from the original Czech in *Meteorologické Zprávy*, Prague, 6(5):121–122, Oct. **1953.** "Translation No. 268." 5 p. 4 refs., eqs. **DWB**—The theory of absolute and relative topography changes following BRANDEJS (1952), ELIASSEN (1959), CHARNEY (1951) and SUTCLIFFE (1950), is developed for an adiabatic atmosphere. *Subject Headings:* **1. Baric topography tendency 2. Relative topography calculations 3. Translations.**—*M.R.*

8.3–206 551.547.1:551.507.352

Cook Research Laboratories, Chic., Ill., **Geostrophic altimetry.** Contract AF 33(038)-23324, Interim Report, No. PR 17-6, Aug. 11, **1952.** 16 p. 3 figs., 5 refs., 8 eqs. **DWB**—Techniques for calculating the height of an airplane within 10 ft by means of geostrophic altimetry are worked out for horizontal flight and for "climbing." Atmospheric (temperature and wind) relationships are taken into account in the theoretical (mathematical and graphic) models which apply the geostrophic and hydrostatic approximation, useful over rough terrain. *Subject Headings:* **1. Geostrophic altimetry 2. Altimetry 3. Airplane height determination.**—*M.R.*

WIND AND TURBULENCE

See also: **Turbulence in lower atmos.** (Saha), 8.3–79; **Eddy viscosity, current and wind** (Fjeldstaf), 8.3–219); **Vertical currents . . .** (Matveev), 8.3–233; **Measurements of wind over cultivated field** (Tani), 8.3–234; **Influence of topography on surface winds, Rivers, Manitoba** (Sporns), 8.3–313; **Radioactivity in atmosphere** (Wilkening), 8.3–331.

8.3–207 551.55:551.542.1

Brandejs, Stanislav, **Analysa ageostrofické složky větru.** [Analysis of the ageostrophic wind component.] *Meteorologické Zprávy*, Prague, 5(1):2–3, **1952.** figs., ref., 12 eqs. **DLC**—Mathematical expressions for various types of ageostrophic wind are developed, namely for: cyclostrophic, allobaric, kinetic, convective, frictional and polar wind. It is found that the geostrophic approximation to free-air circulation is subject to considerable error. Especially significant are cyclostrophic and allobaric wind; frictional and polar wind may be neglected. *Subject Headings:* **1. Ageostrophic winds 2. Geostrophic approximation 3. Cyclostrophic winds 4. Allobaric winds.**—*G.T.*

8.3–208 551.551:551.543:631.43

Fukuda, Hitoshi (*Agr. Faculty, Tokyo Univ., Japan*), **Air and vapor movement in soil due to wind gustiness.** *Soil Science*, Baltimore, Md., 79(4):249–256, April **1955.** 3 figs.,

5 tables, 7 refs., 9 eqs. **DLC**—"The effect of wind gustiness on the transmission of air pressure into the soil and on the volume of air transported through the soil surface" is investigated by deriving a theoretical formula from Darcy's law (that the velocity of air entering a soil volume is proportional to the air pressure gradient in soil) for measuring pressure transmission and air movement in soil. The formula is tested by experimental data of DIEM and TAMACHI, and shown to be correct experimentally. The depth of penetration and the amount of vapor transported by air movement in the soil are discussed. *Subject Heading:* **1. Soil atmosphere interaction.**—*I.L.D.*

8.3–209 551.551

Gifford, Franklin Andrew, Jr., **A simultaneous Lagrangian-Eulerian turbulence experiment.** *Monthly Weather Review*, Wash., D. C., 083(12):293-301, Dec. **1955.** 9 figs., 30 refs., 19 eqs. **DWB.** Also his: **Relations between Eulerian and Lagrangian spectra and correlations in the atmosphere.** Thesis (Ph.D)—Pennsylvania. State Univ. Dept. of Meteorology, July 15, **1955.** 100 p. 17 figs., 79 refs., eqs. Carbon of typescript. **DWB**—The relation between Eulerian-time, Eulerian-space and Lagrangian coordinates is clearly set forth, and the types of equipment used at Brookhaven, N. Y., to study the interrelations between the turbulence spectra in the 3 different coordinates, and finally the quantitative results of the analysis, plus all of the mathematical or statistical evidence, are described and illustrated. A simple relation was found between Eulerian time and space coordinate spectra, so that Bivane readings can be converted to values as observed in an airplane (space), and the spectra look alike. A more complicated relationship, convertible however, was found between Eulerian and Lagrangian (balloon cluster) spectra. The latter shows lower frequencies than the former, showing that the turbulence pattern is carried along by the mean wind. *Subject Headings:* **1. Turbulent fluctuations 2. Eulerian vs. Lagrangian coordinates 3. Brookhaven, N. Y.**—*M.R.*

8.3–210 551.551:517.512

Panofsky, H. A. (*Dept. of Met., Pa. State Univ.*), **Meteorological applications of power-spectrum analysis.** *American Meteorological Society, Bulletin*, 36(4):163–166, April **1955.** 3 figs. **DWB**—The nature of power spectra and their application to meteorological variables are considered. Three types of power spectra are described: Eulerian spectra (spectrum measured at a point), "Lagrangian" spectra (power spectrum relative to a coordinate system moving with individual air parcels), and the spectrum based on instantaneous or nearly instantaneous observations along a line and depending upon wave length rather than frequency. The application of power spectrum analysis to various meteorological variables such as rainfall and turbulence and to general circulation and the numerical determination of a spectrum are discussed. The applications of cross-spectrum analysis to specific meteorological problems are illustrated. *Subject Headings:* **1. Power spectrum analysis 2. Mathematical techniques 3. Turbulence spectru.m**—*I.L.D.*

8.3–211 551.551:551.557:629.13

Pinus, N. Z., **Ob atmosfernoĭ turbulentnosti vyzyvaiushcheĭ boltanku samoletov.** [On atmospheric turbulence producing airplane bumpiness.] *Meteorologiia i Gidrologiia*, No. 2:52–57, March/April, **1955.** 2 figs., 2 tables, 6 refs., 6 eqs. **DLC**—A mathematical analysis of the relationship between bumpiness and airplane load and of the physical atmospheric conditions producing bumpiness are presented. A synoptic chart illustrating the region of bumpiness for a given load is presented. *Subject Headings:* **1. Atmospheric turbulence 2. Bumpiness.**—*I.L.D.*

WIND DISTRIBUTION

See also: **Vorticities computed from geostrophic and observed winds** (Peterson), 8.3–152.

8.3–212 551.552:551.311.31

Volkov, I. A., **O povedenii vetrovogo potoka za barkhanom.** [Air flow patterns behind "barkhans" (sand mounds).] *Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, Leningrad,*

Izvestiia, 87(3):284–287, May/June **1955.** 4 figs., 4 refs. **DLC**—Aerophotographic observations made by the author in western Turkmeniia dispute M. P. PETROV's description of the forms and structure of "barkhans" and the pattern of wind currents around them. The accumulation of sand in the form of narrow canals of Goth "horns" of the "barkhans" and the existence of deflationary depressions at some distance are explained by means of the aerodynamics of wind flow involving the formation of vortices of the ridges of the "barkhans" and the interaction of these with air currents. A diagram of this process and a photograph of the "barkhans" are presented. *Subject Headings:* **1. Airflow behind barkhans 2. Sand dune formation.**—*I.L.D.*

8.3–213 551.552:634.9

Vulterin, Zdeněk, **Studie přízemních vzdušných proudů na Harrachovsku v Krkonoších podle "vlajkových" stromů.** [Study of surface air currents on the basis of wind-blown trees in Harrachovsko, Krkonoš Mountains.] *Česká Akademia Věd a Umění, Prague, Třída 2, Matematicko-Přírodovědecká, Rozpravy*, 60(6), **1950.** 31 p. figs. (1 fold.), 5 plates, 14 refs. **DLC**—The author's method of deriving prevailing wind directions from asymmetric growth of trees (especially those in exposed locations on mountains near the tree line) is explained in detail and illustrated by numerous diagrams and photographs. The method was applied to a field study of the Harrachovsko region of the western Krkonoš mountains. As a result of the painstaking survey a map of the region is presented, showing prevailing local currents at several hundred points, along with the prevailing upper-air gradient wind and regional surface wind directions. *Subject Headings:* **1. Deformation of trees 2. Wind direction 3. Krkonoš Mts., Czechoslovakia.**—*G.T.*

8.3–214 551.552(521.26)

Yamashita, I., **Surface winds in Tokyo.** *Journal of Meteorological Research*, Tokyo 6(1/3):17–20, March **1954.** 6 figs. In Japanese; English summary p. 17. **DWB**—As the topographic features of Tokyo are much complicated, the surface winds are changed considerably at each point. For the purpose of knowing the state of wind, simultaneous observations were carried out at many points. The results are as follows: A) When wind velocity exceeds 6 m/s, wind directions are entirely subject to the topographic features. B) When it is less than 6 m/s, in some cases they are same as for A), and in the other cases by thermal conditions they constitute the cellular vortices, or occasionally a large vortex of blow-off. It seems the phenomena are largely influenced by the height of inversion layer. *Subject Headings:* **1. Surface winds 2. Topographic influences 3. Inversion heights 4. Tokyo, Japan.**—*Author's abstract.*

WIND VARIATIONS

See also: **Summer low, synoptic behavior** (Moriarty), 8.3–22; **Tunis, climatology, surface wind** (Tunis. Ser. Met.), 8.3–24; **Topographic influences on discontinuity surfaces, Snake River Plain, Idaho** (Wilkins), 8.3–169; **Clouds over Madras** (Kriskna Rao, Ganesan), 8.3–255.

8.3–215 551.553.1(521.12)

Kurashige, K., **Wind variation in summer along Kitakami Valley, Iwate Prefecture.** *Journal of Meteorological Research*, Tokyo, 5(6):547–554, July **1953.** 10 figs. In Japanese; English summary p. 547. **DWB**—Analysing records from wind vanes at selected points in Kitakami Valley the author graphically presents statistical material on directional frequency of winds and their diurnal variations. The mechanism of local winds in Kitakami Valley is described as a system of mountain-valley winds and land-and-sea breezes. Variations of these local winds are also compared with those of other meteorological elements, such as rainfall, dewpoint and cloud amount. *Subject Headings:* **1. Diurnal wind variations 2. Local winds 3. Kitakami Valley, Iwate Prefecture, Japan.**—*G.T.*

8.3–216 551.553.11

Clarke, R. H. (*Central Met. Bureau, Australia*), **Some observations and comments on the seabreeze.** *Australian Meteorological Magazine*, Melbourne, No. 11:47–68, Dec. **1955.** 16

figs. (incl. photo), 9 refs. **DWB**—A brief review is made of some current sea breeze theories, with a view to answering some questions about sea breezes in Australia. It is concluded that no theory so far advanced is adequately satisfactory to answer questions about the lateral extent of the circulation. A brief interim report is presented on some observations made last summer in the Kalgoorlie-Esperance area, which show rather conclusively that, on occasion, the sea breeze circulation extends inland for at least 200 mi in a recognizable, although decadent form. *Subject Heading:* **1. Sea breeze theory.**—*Author's abstract.*

8.3–217 551.553.11(548)

Venkateswara Rao, D. (*Regional Met. Centre, Madras*), **Speed and some other features of the sea-breeze front at Madras.** *Indian Journal of Meteorology and Geophysics*, New Delhi, 6(3):233–242, July **1955.** 3 figs., 8 tables, 6 refs. **DLC**—The speed with which the sea breeze advances inland at Madras under various meteorological conditions and its dependence on the time of onset and depth of penetration are discussed in this paper, utilizing the records for the years 1945 and 1946 of autographic instruments at three stations located at different distances from the coast. A velocity of 10–15 mph, a southsoutheasterly direction of the resultant wind, the months April to Sept. and a time of onset during the early afternoon are favored most by the sea breeze at Madras. The average speed of the sea-breeze front is found to be 3–7 mph. It is accelerated with depth of penetration inland independently of the wind speed. It varies with the hour of onset of the sea-breeze, being lowest during the epoch of maximum temperature. The variation of the ratio of the speed inland to that near the coast with time of onset and direction of the on-shore wind is investigated. The results are explained on the basis of the temperature gradient and its variation with distance inland. The mean temperature drop and vapor pressure rise caused by the sea-breeze for different times of incidence and magnitudes of wind velocity in the various months have also been studied. The changes are maximum in the proximity of the epoch of maximum temperature and in the month of July in the year. The results of this study would help in anticipating with sufficient accuracy and sufficiently in advance for aviation needs the time of onset of the sea-breeze and the accompanying meteorological changes at the airfield at Meenambakkam, given the time of incidence and the direction of the on-shore wind earlier at a point closer to the coast. *Subject Headings:* **1. Sea breezes 2. Madras, India.**—*Author's abstract.*

8.3–218 551.553.2:551.543.2(263)

Potter, J. G., **Annual variation in pressure and surface winds over the Atlantic between Labrador and Greenland.** *Royal Society of Canada, Ottawa, Transactions*, Ser. 3, 49:9–14, **1955.** 4 figs., 4 refs. **DLC**—Wind data (1940–1949) from American and Canadian stations in the Davis Strait area and weather ship "Baker" (1948–1951) at 56°00′N 51°30W′ are analyzed. Influence of local topography on wind direction is shown. Mean ocean currents and ice movement, in the months when direct observations are lacking, may be deduced from the data presented here on the general circulation, wind speed and direction. *Subject Headings:* **1. Annual surface wind variations 2. Annual pressure variations 3. Wind data analysis 4. Davis Strait area.**—*W.N.*

VERTICAL DISTRIBUTION AND SPECIAL WINDS

See also: **Winds aloft** (Arnold), 8.3–92; bibliog. on **Specialized Forecasting**, p. 372–401.

8.3–219 551.554:551.551:533.16

Fjeldstaf, Jonas Edman, **Eddy viscosity, current and wind.** *Astrophysica Norvegica*, Oslo, 5(5):153–166, **1955.** tables, 8 refs., 5 eqs. **DWB**—1. Two different forms of the equations of motion for a stationary wind current are considered. Usually the frictional force is expressed by $\frac{d}{dz}\left(\eta \frac{du}{dz}\right)$, while G. I. Taylor maintains that the form should be $\eta \frac{d^2u}{dz^2}$. Some consequences of the equations are deduced, which may serve to decide which of the two forms are to be preferred. Some formulae for the computation of the eddy viscosity and the shear stress are deduced. 2. The "Leipzig" wind profile observed by Mildner and further examined

by H. LETTAU is considered. The values of the eddy viscosity calculated by LETTAU are extrapolated down to the ground. With these values the equations of motion of the stationary wind are integrated numerically, and it is found that the eddy viscosity must decrease from the value $\eta = 128$ in 50 m. to $\eta = 1.0$ at the ground. 3. The same values of the eddy viscosity and the same gradient wind are used for a calculation of a stationary wind current, when the sea and the atmosphere are regarded as one dynamical system. *Subject Headings:* **1. Equations of motion 2. Wind profiles 3. Eddy viscosity.**—*Author's abstract.*

8.3–220 551.554:551.557.3

Singer, Bernard M. (*Geophysics Res. Directorate, A. F. Cambridge Res. Center*), **Wind variability as a function of time at Muroc, California.** *American Meteorological Society, Bulletin*, 37(5):207–210, May **1956.** 7 figs., 2 tables, 2 refs., eqs. Also issued as: *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics*, No. 72, Sept. **1955.** 19 p. 11 figs., 4 tables, 14 refs., eqs. **DWB, DLC**—Records of 226 sets of triple theodolite balloon observations taken at Muroc, California, to heights of 38,000 feet have been analyzed to determined magnitudes of horizontal vector wind changes over time intervals from thirty minutes to five hours. The medians of magnitudes of velocity change vary from 2.0 mph over a time interval of 30 minutes to 6.4 mph over a time interval of five hours. The effect of altitude upon time variability of these winds has been studied. The height interval from the surface to 38,000 feet was separated into four altitude zones and it was found that wind variability is greater near the surface than in the zone above it. From the second zone upward, wind variability increased with height. *Subject Headings:* **1. Upper air wind variability 2. Theodolite observations 3. Wind variability 4. Muroc, Calif.**—*Author's abstract.*

8.3–221 551.555.1:551.576.1:551.515.2

Malkus, Joanne S., **Trade winds and trade wind clouds.** *Oceanus*, Woods Hole, Mass., 4(3):8–12, Spring **1956.** 5 photos. **DWB, DLC**—A nontechnical summary of work done by Woods Hole meteorologists in promoting understanding of the mechanism of the trade winds and the cumulus clouds, which act as a link in the heat balance and as a brake to keep the trade winds steady. When this brake breaks down, it is possible for enough heat and moisture to accumulate in low levels to enable hurricanes to form, but usually a balance is maintained. *Subject Headings:* **1. Trade wind cumulus clouds 2. Hurricane genesis.**—*M.R.*

8.3–222 551.555.12

Vujičić, K., **Maloja vetar.** [Maloja wind.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 3(3/4):117–118, July/Dec. **1954.** fig. **DWB**—The Maloja wind of the Enn river in Switzerland is the reverse of an ordinary mountain-valley wind inasmuch as it blows down into, the valley during the day and up out of the valley at night. The wind blows up out of a deeper valley over the Maloja ridge into the Enn Valley during daytime and reverses itself at night. A counter wind prevails just above this surface wind (schematic profile shows diurnal regime). *Subject Headings:* **1. Maloja wind 2. Switzerland.**—*M.R.*

8.3–223 551.555.6

Suda, Ken (*Central Met. Obs., Tokyo*), **On the cold wave of January 1954 in the Far East.** *Geofisica Pura e Applicata*, Milan, 32:159–169, Sept./Dec. **1955.** 8 figs. (maps and charts), 6 refs. **DWB, DLC**—A synoptic study is made based primarily on 10-day and 5-day mean maps on an unusually cold spell which appeared all over the Far East in the end of January, 1954, following an abnormal warmth. It is found that while it is warm in Japan, cold air is accumulated in Siberia to the north of the climatological jet stream and is confined in the northern latitudes by the latter as long as the high index pattern prevails. But once the index drops, with the southward displacement of the jet stream, the permanent trough of the Far East deepens and the cold air so far accumulated is allowed to penetrate into southern latitudes. Some characteristic features of contour pattern and frontal activity preceding and following the cold air outbreak are described. Further, it is shown that the blocking wave directly related to the cold air outbreak in the Far East can be traced from as far east as North America or possibly the eastern Atlantic. *Subject Headings:* **1. Cold waves 2. Jet stream effects 3. Far East.**—*Author's abstract.*

WIND EFFECTS

See also: **Utilization of wind energy** (Barasoain), 8.3–16; **Effect of wind on subsurface water temperatures, Thunder Bay** (Einarsson), 8.3–194; **Snow control of shelterbelt** (Shiotani, Arai), 8.3–272.

8.3–224 551.556:634.9

Křivský, Ladislav, **Větrné poměry a vlajkové stromy.** [Wind conditions and tree distortion.] *Meteorologické Zprávy*, Prague, 8(4):100–102, Aug. **1955.** 7 figs., 6 refs. Russian summary p. 100. **DWB**—Wind conditions at the Astronomical Institute at Ondrejov during the 8-year period 1946–1953 are compared with measurements of the axial inclinations of 26 pine trees. The trees are situated mostly in single units in the observatory park on a moderate hill (528 m a.s.l., 49°55′N, 14°47′E). The method of determining prevailing wind direction from measured trunk inclination and crown deformation is described. Climatic data of the meteorological station agree with results obtained from the "climatic indicators." Applications of the method to architecture (where the knowledge of prevailing wind is necessary) are indicated. *Subject Headings:* **1. Tree inclination 2. Wind regime 3. Ondrejov, Czechoslovakia.**—*Trans. of author's abstract.*

8.3–225 551.556:551.46

Neumann, Gerhard (*Dept. of Met. and Oceanog., New York Univ.*), **Wind stress on water surfaces.** *American Meteorological Society, Bulletin*, 37(5):211–217, May **1956.** 2 figs., 28 refs., 4 eqs. **DWB**—Various attempts to estimate the total wind stress at the sea surface are briefly reviewed, and the difficulties in the application of the methods used in the past are discussed. The results obtained under natural conditions, that is over larger bodies of water, such as the open sea or large lakes, agree fairly well with each other, whereas great discrepancies are observed with wind tunnel experiments. It is conceivable that the stress values obtained from wind tunnel experiments only hold for the special conditions encountered with small scale flow models. The most important hydrodynamical differences in the flow at both sides of the air-sea interfaces between small scale models and large scale natural bodies of water are pointed out. *Subject Heading:* **1. Wind stress on water.**—*Author's abstract.*

8.3–226 551.556:532.593

Schooley, Allen (*Naval Res. Lab., Wash., D. C.*), **Facet separation distributions of wind-created water waves.** *American Geophysical Union, Transactions*, 36(6):993–994, Dec. **1955.** 3 figs., 3 refs. **DWB, DLC**—Optical measurements made using a small water-wind tunnel, having a maximum fetch of 26 inches, indicate that the median minimum distance between the centers of facets of the surface is approximately 0.14 inch for wind velocities between 11 and 22 knots. In this range the first quartile of the distributions is about 0.09 inch and the third quartile is about 0.25 inch. Below 11 knots the median separation between the facets increases rapidly. *Subject Headings:* **1. Wind waves 2. Water-wind tunnels 3. Wind effects on water surfaces.**—*Author's abstract.*

8.3–227 551.556:551.465

*Stommel, Henry, **Serial observations of drift currents in the central North Atlantic Ocean.** Woods Hole Oceanographic Institution, Contract Nonr-769(00) (NR-083-069), Technical Report (unnumbered), April **1954.** 8 p. 6 figs., 4 tables, 2 refs. **DWB**—Analysis of results of a series of nearly continuous drift-current observations off Bermuda between Oct. 21, 1953 and Feb. 9, 1954, using drifting radio buoys and a mobile radio direction finding station. Tracks of all buoys are shown on chart. Data for 65 days in the 3½ months period are usable. Buoy is described and illustrated. It is 2 ft in diameter, 5 ft high with a 6 ft mast with a 4-cup anemometer and a 30 w transmitter and floats with 5 in. of free-board. The metal drogue extends from 120 to 530 ft below. Number of reproductions of rotor and of anemometer, magnetic heading and wind direction are transmitted every 3 hrs and recorded automatically on magnetic tape on land station. Range of satisfactory operation is 45 mi. Evidence of macroturbulence effects in sea produce great deviations from the true Ekman relation of wind to current, but currents to right of wind were definitely more frequent than those to

:he left, and the mode was at 20° to right of wind if all cases (light and strong winds) were used. Data for Oct. 28–31, 1953 are analyzed in greater detail to show real nature of relation of wind to current. Angle between wind direction and motion of buoy is not accurate if buoy wind is used as it is if observatory wind is used. In strong winds the current is 30°–60° to right of wind; in weak winds much greater spiral occurs. Ratio of current speed to wind speed s twice Ekman's values, and is non-linear on a log scale (Ekman suggests current speed is proportional to 3/2 power of wind speed, and this seems reasonable). *Subject Headings:* **1. Drift currents 2. Ocean currents 3. Wind driven currents 4. Ekman spiral 5. North Atlantic.**—*M.R.*

8.3–228 551.556:525.6

†U. S. Beach Erosion Board, **Laboratory study of wind tides in shallow water.** Its *Technical Memorandum*, No. 61, Aug. **1955.** 50 p. 25 figs. (incl. photos), 22 refs., 41 eqs. **DWB**—Wind tides and wave conditions in shallow water were studied in a laboratory channel. The experiments were conducted with smooth and rough bottom conditions, and with strips of cheese cloth in the channel to simulate the roughness effects of vegetation in nature. The results indicate a rapidly increasing set-up when the still-water depth decreases below a certain limit. There were no indications that the bottom roughness affects the set-up for relatively deep water; in very shallow water, however, the rougher bottom conditions result in higher set-ups. The trend is especially pronounced for higher wind velocities. For the shallowest still-water depth (0.05 ft) used in the experiments, the set-up was approximately 10% higher for the rough bottom, and approximately 20% higher when strips of cheese cloth were used in the channel to simulate the roughness effect of vegetation, than the set-up observed with a smooth bottom. *Subject Heading:* **1. Wind tides.**—*Author's abstract.*

UPPER AIR WINDS

See also: **Upper wind fields, kinematic analysis** (Mulky), 8.3–124; **Effect of Tibet plateau on atmos. circulation, East Asia** (Koo), 8.3–160; **Horizontal temp. gradient at 200 MB** (Kochanski), 8.3–190; **Atmos. turbulence** (Pinus), 8.3–211; **Wind variability as a function of time, Muroc, Calif.** (Singer), 8.3–220; **Mountain wave—Jet Stream Project** (Klieforth), **8.3–235**; bibliog. on **Specialized Forecasting**, p. 372–401.

8.3–229 551.557:551.513

†Pant, Pemmaraju S. (*Dept. of Met. and Oceanog., N. Y. Univ.*), **Circulation in the upper atmosphere.** *Journal of Geophysical Research*, Wash., D. C., 61(3):459 474, Sept. **1956.** 5 figs., 6 tables, 48 refs., eqs. **DLC.** Also issued as: N. Y. Univ. College of Engineering. Research Div., Contract AF 19(604)-1006, Scientific Report, No. 1, May **1955.** 43 p. 8 figs., 9 tables, 56 refs., eqs. (*See* 7.3–212, March 1956, *MAB.*) **DLC**—The winds in the region of the atmosphere from 20 to 100 km elevation over the Northern Hemisphere are critically examined. The summer and winter temperatures are computed from the wind field with the aid of rocket mean pressure data and under the assumption that the wind field is geostrophic. The temperatures obtained are found to agree with direct observations. Thus the observed wind and temperature distributions are shown to be consistent. Possible causes of some of the observed seasonal temperature changes in different parts of the upper atmosphere are discussed. The zonal wind cross-sections prepared in this investigation are compared with wind distributions published earlier and found to agree fairly well with them. On the basis of the wind distributions and of theoretical considerations, the circulation in the mesosphere and thermosphere is derived. *Subject Headings:* **1. Upper air circulation 2. Upper air winds 3. Northern Hemisphere.**—*Author's abstract.*

8.3–230 551.557:551.510.535:551.501.8

Yerg, Donald G., **Observations of ionospheric drifts and related phenomena with spaced radio receivers.** Puerto Rico. Univ. College of Agriculture and Mechanic Arts, Contract AF 19(122)-476, Scientific Report No. 3, Aug. **1955.** 67 p. 29 figs., 7 tables, 6 refs., numerous eqs.—Radio Fading Records have been obtained at spaced receivers since January 1954. The six-point Correlation Method has been applied to 86 records corresponding to 2.33 Mcs

and to 68 records corresponding to 4.57 Mcs. The Method of Similar Fades has been applied to 448 records for 2.33 Mcs and to 271 for 4.57 Mcs. Directions and velocities are more variable in winter than summer, and in summer are toward North at 4.57 Mcs and toward northeast or southwest at 2.33 Mcs. Large values of turbulence invalidate velocities obtained by the Method of Similar Fades and make unreliable directions computed from small samples. Elliptical contours and anisotropic turbulence may result in small systematic differences between the two methods. A general expression for drift velocity is derived and related to correlation analysis. Velocity vectors obtained for each component of the Fourier expansion of the signal intensity-time records show a grouping about a straight line for records characterized by short mean fading periods and large turbulence and wind scatter for records with long fading periods and small turbulence. *Subject Heading:* **1. Ionospheric wind measurement.** —*A.A.*

8.3–231 551.557.2(931,96)

Porter, Elizabeth M., **Upper winds over Nandi and Auckland.** *New Zealand. Meteorological Service, Technical Note*, No. 92, Oct. 28, 1952. 3 p. 6 refs. **DWB**—Monthly and seasonal mean wind vectors and the standard vector deviations about the mean are given for levels up to 70,000 ft over Nandi and 80,000 ft over Auckland, based on radar wind observations. These mean winds show that at all seasons at both stations the level of strongest winds is at about 45,000 ft. *Subject Headings:* **1. Upper air winds 2. Auckland, New Zealand 3. Fiji Islands.**—*Author's abstract.*

8.3–232 551.557.3

§Väisänen, Aimo (*Met. Office, Helsinki*), **Comparison between the geostrophic and gradient wind in a case of westerly jet.** *Geophysica*, Helsinki, 4(4):203–217, 1954. 12 figs., 10 refs., 4 eqs. **DWB**—In order to evaluate the accuracy of the geostrophic vs. the gradient wind when speeds are very high, a case of a cold wave and westerly jet over North America (January 22, 1951) is analyzed and surface, 500 mb height and temperature charts and three cross sections through the cold trough presented by way of illustration. The vertical profile of geostrophic and gradient wind in vicinity of the jet shows a large departure at 500 to 300 mb (at 320 mb the values were 110 m/sec and 62 m/sec, respectively). Actual winds were not available at 700 mb. The deviations were negligible but were at a maximum at the wind maximum or jet. The ageostrophic component caused by diffluence was much smaller than the pure cyclostrophic component. An Isentropic surface (318°) is analyzed to show isobaric, jet stream and tropopause relationships with potential temperature. *Subject Headings:* **1. Geostrophic-gradient wind deviations 2. Synoptic-aerological analyses 3. Jet stream maxima.**—*M.R.*

VERTICAL MOTION

See also: **Blocking in the Far East** (Saito), 8.3–161; **Lee waves in atmos. models with continuously distributed static stability** (Wurtele), 8.3–196; **Development of a lee wave** (Wurtele), 8.3–197.

8.3–233 551.558:551.551

Matveev, L. T., **Vertikal'nye toki v pogranichnom sloe atmosfery.** [Vertical currents in the boundary layer of the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.* No. 5:453–461, Sept./Oct. 1955. 3 figs., 2 tables, 12 refs., 34 eqs. **DLC**—A method is developed for calculating the vertical velocity in the bordering layer of the atmosphere for any height within the friction layer with changing values of the coefficient of turbulent exchange and wind velocity with height. This method takes into account the factors of thermal stability, roughness of the earth's surface, velocity of free currents and the latitude. The calculation of vertical velocity within the limits of the bordering layer, and also of the parameters of turbulent exchange (coefficient of turbulence, etc.) is effected only with the aid of data obtained from synoptic charts. *Subject Headings:* **1. Vertical velocities 2. Turbulent exchange 3. Turbulence coefficient.**—*Trans. of author's abstract.*

8.3–234 551.558:551.551

Tani, N.; Inoue, E. and Imai, K. (*all, Nat'l Inst. of Agric. Sci.*), **Some measurements of wind over the cultivated field, Pt. 3.** *Journal of Agricultural Meteorology*, Tokyo, 10(3/4):105–108, March **1955.** 4 figs., 2 tables, 6 refs., eqs. In Japanese; English summary p. 108. **DWB**—On Sept. 14, 1954, when typhoon No. 12 was over the Sea of Japan, wind observations were made over a rice field, at Chigasaki, with 6 small Robinson cup anemometers installed on a pole 6 m high. The vertical distributions of wind velocity and turbulence were obtained: 1) The vertical distributions of mean wind velocity were well represented by the logarithmic law,

$$U_{(z)} = \frac{2.30\ V_*}{k} \operatorname{Log} \frac{z-d}{z_0},$$

and the roughness parameter z_0 and zeroplane displacement d were found to change in accord with the wind velocity. When the wind velocity at 2 m height was within the range 5.5–7.7 m/sec, d was reduced and z_0 was increased, respectively, with the wind velocity. (2) Observations obtained before at other rice fields were also reconsidered, and it was found that, except in a few cases where the wind velocity was less than 1 m/sec, d and z_0 decreased, respectively, with the wind velocity up to 5 m/sec, and when the wind velocity was increased over 5 m/sec, d was reduced and z_0 was increased, respectively. (3) The fluctuation in wind velocity was observed by reading the anemometer counter every 5 sec. The energy of turbulence (u'^2) increased very little with the averaging time ranging from 1 to 30 min and increased with height. The intensity of turbulence $(u'^2)^{1/2}/U$ decreased slightly with height. (4) Eulerian-correlation coefficients for velocity fluctuation were calculated and the empirical result was $R^{(t)} - 1 = \text{const.}\ t^{1/3}$. These results obtained are apparently different from the theoretical ones based on the Similarity Theory of Turbulence. These discrepancies might be partly due to the fact that the inertial subrange of turbulence is too small to be observed by the method mentioned above. *Subject Headings:* **1. Vertical wind velocity distribution 2. Turbulence measurements 3. Rice paddies 4. Wind velocity 5. Chigasaki, Japan.**—*Authors' abstract.*

8.3–235 551.558 21:551.513.2:551.557

Klieforth, Harold, **Mountain Wave—Jet Stream Project.** California. Univ. at L.A., Dept. of Meteorology, Contract AF 19(604)-1308 Final Report, August **1955.** 39 p. 7 figs. (incl. photos). **DWB**—This final report covers all the activities which have been carried out under the Mountain Wave-Jet Stream Project by the Department of Meteorology at U.C.L.A. The report also describes the activities carried out by the personnel and aircraft of Project Jet Stream of G.R.D. during the period in which they participated in the field operations near Bishop, California. A description of the observational program is followed by summaries of project flights, cloud photography and significant weather observations. The last section contains a report on data reduction and analysis, a listing and evaluation of the data collected, and the status of synoptic research. *Subject Headings:* **1. Mountain Wave-Jet Stream Project 2. Project Jet Stream.**—*Author's abstract.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY AND EVAPORATION

See also: **Potential evapotranspiration, Nigeria** (Garnier), 8.3–117; **Rendqvist's evaporation recorder . . .** (Porkka), 8.3–118; **Variations of ozone and water vapor concentrations** (Brewer), 8.3–157; **Hemispheric poleward flux of water vapor** (Starr), **8.3–159.**

8.3–236 551.571:633.1

Protserov, A. V., **Otsenka usloviĭ raboty zernovykh kombaĭnov po meteorologicheskim dannym v raĭonakh osvoeniia tselinnykh i zalezhnykh zemel'.** [Evaluation of the working conditions of grain combines on the basis of meteorological data in the regions where virgin

and fallow lands are being brought under cultivation.] *Meteorologiia i Gidrologiia*, Moscow, No. 3:3–7, May/June **1955.** 2 figs., 3 tables. **DWB**—The results of an investigation of the effect of weather conditions upon the operations of grain combines, made from Sept.–Oct. 1954 in the Novosobirsk and Kemerovsk Oblasts and in the Altai Territory, are summarized. The moisture content of seed, chaff and ear is influenced by the moisture deficit of the atmosphere. Data are presented on the relationship between the daily variation in the moisture content of the harvest and the atmospheric moisture deficit, and on the relationship of amount of unthreshed grain per cubic meter and atmospheric moisture deficit and graphs show the variation of moisture content of grain and oats with atmospheric moisture deficit. The effect of rainfall amounts upon the work of combines is discussed. *Subject Headings:* **1. Agricultural meteorology 2. Soil moisture 3. Harvested grain moisture 4. Moisture deficiency.**—*I.L.D.*

8.3–237 551.571:001.4

Vujević, P. M., **Kombinovani klimatski elementi.** [Combined climatic elements.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 4(1/2):2–7, Jan./June **1955.** fig., 3 tables, 19 refs. (p. 36–37), 3 eqs. **DWB**—Explains the nature, measurement and applications of three climatological elements: psychrometric value, wet-bulb temperature and relative humidity. *Subject Headings:* **1. Hygrometric elements 2. Definitions.**—*G.T.*

8.3–238 551.573:551.571.3(43)

Dammann, W., **Klimatische Unterschiede der Verdunstungskraft.** [Climatic variation of evaporative power.] *Wasserwirtschaft*, Stuttgart, 46(2):37–40, Nov. **1955.** 5 figs., table. **DLC**—Frequency of saturation deficit for day and night, summer and winter are given for Norderney and Göttingen, as well as maps for summer values at 1400 over Northwest-Germany. Differences, depending on weather conditions are explained. *Subject Headings:* **1. Saturation deficit 2. Evaporation 3. Northwest Germany.**—*A.A.*

8.3–239 551.573:551.594.21

Miura, Akira (*Tohoku Univ.*), **Investigation of evaporation in the electric field.** *Tohoku Univ. Science Reports, 5th Ser., Geophysics*, 5(3):160–162, Dec. **1953.** 2 figs., 2 tables, 4 refs. **DLC**—Experimental data are presented from which it would appear that various liquids including water have a higher rate of evaporation in an electric field than normally. It is suggested that the electric field existing in cumulonimbus clouds may have some importance from the point of view of cloud physics. *Subject Headings:* **1. Evaporation in electric field 2. Cloud physics.**—*G.T.*

8.3–240 551.573:551.481.1

Tsigmit, Shagandyr, **Usykhaiut li ozera zapadnoĭ Mongolii?** [Are the lakes of western Mongolia drying up?] *Priroda*, Moscow, 44(7):113, July **1955.** 3 refs. **DLC**—In order to solve the controversial question of the drying up of Mongolia's lakes, analyses of water samples of Khara-Usu (1760 sq km) and Khirgis (1360 sq km), lakes of the "Great Lake Hollow" north of the Altai Mountains, were carried out by 3 investigators (1926, Smirnov; 1951, Bespalov; and 1952, the author). Figures show that during 26 yrs no change has occurred in the mineralization of water of Khirgis Lake where in all 3 investigations it was found to be about 1.46 g/l. This confirms the opinion of investigators who deny the progressive drying up of Mongolia's lakes. On the other hand, the salt content in Khara-Usu Lake varies greatly between 0.112 and 0.244 g/l in individual years. The author finds this to be quite normal because it has an outlet and its water level and amount vary greatly due to water inflow, outflow, precipitation amount and evaporation from the lake's surface. *Subject Headings:* **1. Evaporation from lakes 2. Lake desiccation 3. Mongolia.**—*A.M.P.*

8.3–241 551.573:551.585.5(47)

Zubenok, L. I., **Ob opredelenii ispariaemosti dlia zasushlivykh raĭonov SSSR.** [Evaporation determination for arid districts of the U.S.S.R.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia*, 86(6):542–545, Nov./Dec. **1954.** fig., 6 refs. **DLC**—The empirical method of N. N. Ivanov and the heat balance method of Budyko for measuring potential evaporation are

liscussed. BUDYKO's method gives results which agree with actual field measurements. The ormula for potential evaporation, developed by BUDYKO $\frac{31}{L}(R_o - B)$, where L—latent heat of vaporation, R_o—magnitude of radiation balance of an active surface at a given place and B—heat exchange in the soil, is used to calculate potential evaporation for April–Sept. for atitudes 40°–55° in the U.S.S.R. *Subject Headings:* **1. Evaporation calculations 2. Potential vaporation 3. Arid climates 4. U.S.S.R.**—*I.L.D.*

CONDENSATION

See also: **Air chemistry** (Junge), 8.3–139; **Adsorption of ions by Water drops** (Breido), 8.3–326.

8.3–242 551.574:551.575 551.578.41

Lauer, O.; Pluvinage, P. and Taylor, G., **Étude microphotographique de brouillards, eige et chasse-neige sur l'Inlandsis Groenlandais.** [Microphotographic study of fogs, now and drifting snow on the Greenland Ice Cap.] *Annales de Géophysique*, Paris, 11(4): 75–480, Oct./Dec. **1955.** 8 photos, 5 tables, 12 refs. **DLC**—Microphotographs of fog and now particles taken in central Greenland in winter and spring 1950 are discussed. Crystal orms observed under various temperature and wind conditions are described. With temerature above −35°C and wind speed below 12 knots supercooled water droplets having an verage diameter of 20μ usually are present. *Subject Headings:* **1. Fog particles 2. Snow tructure 3. Supercooled water drops 4. Greenland.**—*G.T.*

8.3–243 551.574.1:551.578.11

Basu, S. and Das, P. K. (*Meteorological Office, Poona*), **Some aspects of the growth of loud droplets by coalescence.** (In Symposium on Artificial Rain, New Delhi, Feb. 1953, 'roceedings and Papers. pub. **1955.** p. 10–18. 3 figs., 11 refs., 7 eqs.) **DWB**—The role of oalescence in clouds which do not reach up to the freezing level is discussed in the first part f the paper. As a first approximation, the growth of a large drop falling through a cloud of mall drops has been computed and shown to depend largely on the speed of updraught. n the second part of the paper the difficulties in determining the collection efficiency for small rops are considered. Earlier workers had assumed that the air motion ahead of a spherical rop was either potential flow or completely viscous flow, but both assumptions appear to be nadequate for low Reynold's Numbers. The use of a new stream function, obtained by 'OMOTIKA and AOI, has been found to overcome this difficulty. *Subject Headings:* **1. Raindrop oalescence 2. Raindrop growth 3. Cloud droplets.**—*Authors' abstract.*

8.3–244 551.574.1:551.578.11

Best, A. C., **Coalescence as a factor in drop size distribution in cloud.** *Great Britain. Meteorological Research Committee, M.R.P.*, No. 639, March 28, 1951. 6 p. 4 refs., 14 eqs. **)WB, GB-MO**—Equations representing the rate of change of the number of drops of a given ze in a cloud show condensation to be much more effective than coalescence in determining rop size distribution in clouds with small average drop size, with small liquid water content r with large degree of supersaturation. Equations are based on optimum coalescence condi- ons and developed through elaborate mathematical deductions. *Subject Headings:* **1. Coa- scence of drops 2. Drop size distribution 3. Cloud physics.**—*G.T.*

8.3–245 551.574.1:551.588.7

Bider, Max (*Univ. Basel, Binningen, Switzerland*), **Ergebnisse der Registrierungen der ahl der Kondensationskerne in Basel und seiner nächsten Umgebung.** [Results of record- ngs of the condensation nuclei count in Basel and its immediate surroundings.] *Geofisica 'ura e Applicata*, Milan, 31:147–161, May/August **1955.** 8 graphs, 6 tables, 8 refs. English ummary, p. 147. Discussion, p. 160–161. **DWB, DLC**—Continuing previously communi-

cated results of recordings with the Verzár nuclei counter at Basel, the influences of chang of air masses, of sunshine and precipitation on nuclei concentration are studied. Furthermo the results of simultaneous recordings in the centre of the city and on the outskirts and at near-by village are thoroughly discussed. A further comparison between Basel and Payer shows connections between daily means of nuclei concentration of these two towns, which a about 100 km apart. *Subject Headings:* **1. Condensation nuclei counts 2. Urban influenc 3. Switzerland.**—*Author's abstract.*

8.3–246 551.574.1 551.578.1

Boucher, Roland J. and Bartnoff, Shepard, **A comparison of theoretically derived an observed drop-size distributions in clouds and rain.** Tufts Univ. Dept. of Physics. R search Laboratory of Physical Electronics, Contract AF 19(604)-550, Scientific Report, No. July 10, **1955.** 30 p. 11 figs., 4 tables, 6 refs., 8 eqs. **DWB**—The functions $y(x) = (m \ln$ $x^{m-1} \exp(-x^m \ln 2)$ derived from BEST's formula and $y_n(x) = Ax^{(a/b)-1}(2-x^{1/b})^2$ develope by ATLAS and BARTNOFF are compared and found to be nearly identical for distributio parameters obtained from natural clouds and rain. The moments μ_2, μ_3 and μ_4 compute from individual distributions are found to be highly correlated with similar moments obtaine from the family of curves described by Best's function, indicating that natural distributio in clouds and rain can be satisfactorily represented analytically. *Subject Headings:* **1. Clou droplet size distribution 2. Raindrop size distribution.**—*Authors' abstract.*

8.3–247 551.574.1:551.584.6

Burke, T. and Nolan, P. J. (*Univ. College, Dublin, Ireland*), **Nucleus content of air i occupied rooms.** *Geofisica Pura e Applicata*, Milan, 31:191–196, May/August **1955.** 5 table 9 refs. German summary p. 191. **DWB, DLC**—1) Indoor concentration is less than outdo concentration when precautions are taken to prevent indoor contamination of the air; 2) Nucl are not produced by breathing. The nucleus content of exhaled air is less than that of th inhaled air; the loss appears to be mainly a diffusion loss; 3) Occupancy does not produce an detectable change in nucleus content; 4) A hypothesis is advanced to explain how occupanc might cause a slight decrease in small ion content without causing any increase in nucle content. *Subject Headings:* **1. Nuclei count 2. Indoor air.**—*Authors' abstract.*

8.3–248 551.574.1:533.60

Fea, Giorgio, **La galleria aerodinamica a circolazione naturale dell' Osservatorio di Mon Cimone.** [Free circulation wind tunnel at the Mount Cimone Observatory.] *Rivista Meteorologia Aeronautica*, Rome, 15(1):12–15, Jan./March **1955.** 6 figs., French, English an German summaries p. 12. **DLC.** (Also in: Italy. Servizio Meteorologico dell'Aeronautic **Il Servizio Meteorologico dell'Aeronautica Italiana alla X Assemblea Generale U.G.G.I. Rom 1954.** p. 37–40. 5 figs. English summary p. 37.) **DWB**—With the aid of photographs an diagrams the author describes the design, construction and installation of a small size fre circulation wind tunnel for experimental studies on the particle number and size of cloud on the aggregate state of clouds, ice formation, etc. *Subject Headings:* **1. Wind tunnel 2. Cloud nuclei.**—*I.L.D.*

8.3–249 551.574.

Halsey, G. D., Jr. and Freeman, M. P., **Some remarks on physical adsorption.** *U. S Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 37, Vol. 3:1–2 July **1955.** 4 figs., 14 refs., eqs. **DLC**—The history of research on physical adsorption reviewed and work of the author and collaborators presented quantitatively and discussed b VONNEGUT, WEICKMANN, HACKER, EMMETT, REISS and others. The main question is whethe or not nuclei form by homogeneous gas phase nucleation and subsequent condensation, c mainly by condensation on foreign bodies—especially near or above saturation pressure. Ho layers of water build up and react with the environment when deposited or adsorbed on ic or AgI or other crystals, is especially pertinent. *Subject Headings:* **1. Adsorption on ic 2. Nuclei formation.**—*M.R.*

8.3–250 551.574.1

Hill, Terrell L. (*Naval Med. Res. Inst., Bethesda, Md.*), **Note on the physical adsorption of gases in capillaries and on small particles (nucleation of condensation).** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 37, Vol. 3:51–59, July 1955. 3 figs., 10 refs., 16 eqs. **DLC.** Reprinted from *Journal of Physical and Colloid Chemistry*, 54(8), Nov. 1950. **DLC**—An approximate theoretical picture, which leads to good agreement with experiment in some cases of physical adsorption on nonporous solids, is extended to adsorption in pores and on small spherical particles. The phenomena of capillary condensation and nucleation of condensation of a supersaturated gas are discussed in this connection. *Subject Headings:* **1. Condensation nuclei 2. Adsorption.**—*Author's abstract.*

8.3–251 551.574.1:551.594.11

Israël, H., **Condensation nuclei as connecting link for meteorological-electrical relations.** Germany. Deutscher Wetterdienst, Contract AF 61(514)-640, Technical Notes, No. 1, Aug. 1, 1955. 9 p. 7 figs., 14 refs. "Enlarged form of paper presented at Symposium on Condensation Nuclei," Dublin, April 1955.—Also **Die Kondensationskerne als Bindeglied luftelektrisch-meteorologischer Zusammenhänge.** *Geofisica Pura e Applicata*, Milan, 31:162–168, May/Aug. 1955. 5 figs. (4 graphs), 13 refs., 4 eqs. English summary p. 162. **DWB, DLC**—The weather phenomena are connected with electrical effects. This can be interpreted as "variable circuit elements" or as "generators." The connecting link is given by the condensation nuclei which are produced on the ground and are carried into the atmosphere by the "Austausch." Some results of the condensation nuclei at Jungfraujoch (Switzerland)—carried out with a recording nuclei counter (VERZAR)—are given and discussed. Measurements of the potential gradient in the free atmosphere by radiosondes (KOENIGSFELD) show that the greatest variability of the potential gradient is not to be found on the ground but in some kilometers of height. This result is interpreted as an effect of the vertical mass exchange on the content of condensation nuclei in various heights. *Subject Headings:* **1. Condensation nuclei variations 2. Potential gradient variations 3. Atmospheric electricity.**—*Author's abstract.*

8.3–252 551.574.1

Mason, B. J., **The appearance of ice crystals in expansion- and mixing-cloud chambers.** *Puy-de-Dôme. Observatoire, Bulletin, Ser. 2*, No. 3:65–75, July/Sept. 1955. 2 figs., table, refs. English summary, p. 66. **DWB**—The theory of spontaneous nucleation of supercooled water together with MOSSOV's observation that water droplets of diameter 1μ freeze within about $\frac{1}{2}$ sec at $-41°C$ have been used to calculate the concentrations of ice crystals which should appear at different temperatures in the expansion and mixing-type cloud chambers used by various workers. It is shown that the numbers of ice particles appearing at temperatures below about $-32°C$ in cold chambers and in the large expansion chambers of Findeisen and Schulz may be largely attributed to the spontaneous nucleation of the cloud droplets, but that at higher temperatures the ice-forming nuclei must consist of foreign particles. It is argued that the latter are solid, insoluble particles (e.g., silicates), or "mixed" nuclei, and the results of the FINDEISEN-SCHULZ experiments are interpreted on the basis of these assumptions concerning the nature of the responsible nuclei. *Subject Headings:* **1. Spontaneous nucleation experiment 2. Ice crystal formation 3. Cloud chambers.**—*Author's abstract.*

8.3–253 551.574.1

Miura, Akira (*Tohoku Univ., Geophysical Inst.*), **On the concentration of silver iodide particles in the atmosphere.** *Tohoku Univ. Science Reports, 5th Ser., Geophysics*, 7(2):73–81, Nov. 1955. 9 figs., 14 refs., 11 eqs. **DWB, DLC**—Using experimental results of the large scale diffusion of the smoke particles in the free atmosphere by BRAHAM, SEELY and CROZIER, and those of the effectiveness of silver iodide smoke particles as freezing nuclei by BOLTON and QURESHI, we calculated the concentration of silver iodide particles as freezing nuclei for the $-5°C$ level and the $-20°C$ level in the atmosphere. *Subject Heading:* **1. Silver iodide nuclei.**—*Author's abstract.*

FOG

See also: **Analysis of radiation in fog layers, Chandrasekhar's method** (Lenoble), 8.3–172; **Fogs, snow on Greenland Ice Cap** (Lauer et al.), 8.3–242; bibliog. on **Specialized Forecasting,** p. 372–401.

8.3–254 551.575.5:312.2:551.510.42

Logan, W. P. D. (*Chief Medical Statistician, General Register Office, London*), **Mortality from fog in London, Jan. 1956.** *British Medical Journal,* London, No. 4969:722–725, March 31, **1956.** 2 figs., 13 tables, 5 refs. **DLC.** Also comment: **Two-day fog kills 1,000 in London.** *Science News Letter,* Wash., D. C., 69(15):233, April 14, **1956. DGL, DLC.** Also: **The London fog of January, 1956. Estimate of 1,000 deaths.** *Smokeless Air* No. 98:241, Summer **1956.** fig. **DWB**—For the 3rd time since 1948 a high mortality has occurred in London during a period of prolonged fog (Jan. 4–6, 1956). In 1952, 4000 deaths were attributed to smog, and in 1956, 1000 (mainly bronchitis and pneumonia among the aged or very young) more died in the first 2 weeks of Jan. than in the last 2 weeks of Dec. 1955, or in the corresponding period of Jan. in other years. Statistics are presented for each borough of Greater London, for age groups, all and various causes of death, for bronchitis and pneumonia, and atmospheric pollution and temperature data for each day of Jan. 1–14. Only 7% increase in mortality occurred elsewhere in England where fog (not smog) was prevalent. The third article is a summary of a paper by W. P. D. Logan in *British Medical Journal,* March 31, 1956. The rise of deaths during the foggy period of Jan. 3–15 is shown graphically. *Subject Headings:* **1. Smog—London—Jan. 1956 2. Mortality due to smog 3. London, Eng.**—*M.R., C.E.P.B.*

CLOUDS

See also: **Trade winds and tradewind clouds** (Malkus), 8.3–221; **Bishop ring in a hazy sky** (Volz), 8.3–320; **Color of overcast sky** (Middleton), 8.3–322.

8.3–255 551.576.1:551.553.21

Krishna Rao, P. R. and Ganesan, V. (*Regional Met. Centre, Madras*), **On the formation and physical properties of clouds over Madras.** (In Symposium on Artificial Rain, New Delhi, Feb. 1953, [**Proceedings and Papers.**] pub. **1955.** p. 19–32. 4 figs., 7 tables, 6 refs.) **DWB**—Airplane meteorological flights made twice daily at Madras during 1944–46 have provided valuable data regarding heights of base and thickness of clouds and temperature and humidity conditions up to about 24,000 ft. A study of these data for the northeast monsoon periods of 1944 and 1945 is made and statistical information about the height of base and vertical thickness of various types of clouds is presented and discussed. The probability and nature of precipitation in relation to the associated cloud structure are examined and the chief features shown by instances of precipitation during airplane flights are mentioned. Typical tephigrams showing the structure of the atmosphere in active and weak northeast monsoon conditions are presented and discussed. The normal diurnal variation of cloud amount in the northeast monsoon season is examined. A comparison has been made of the amount of clouding in the rainy northeast monsoon season of 1946 and the droughty northeast monsoon seasons of 1947 and 1948. *Subject Headings:* **1. Cloud height data 2. Cloud structure 3. Monsoon clouds 4. Madras, India.**—*Authors' abstract.*

8.3–256 551.576.12:551.578.1

Mook, Conrad P. (*U. S. W. B., Wash. National Airport*), **Stratiform cloud thicknesses associated with drizzle.** *American Meteorological Society, Bulletin,* 36(9):490, Nov. **1955.** fig., table, 2 refs. **DWB, DLC**—Using as basic data a chart (published by Mason and Haworth) illustrating the effect of cloud thickness and height of cloud base in distinguishing between precipitating and nonprecipitating stratiform clouds, the author presents a "table showing for all reported cases of precipitations from stratiform clouds the frequency of occurrence of drizzle as a function of height of cloud base and cloud thickness." *Subject Headings:* **1. Stratus clouds 2. Cloud height 3. Drizzle.**—*I.L.D.*

PRECIPITATION

See also: **Variation of point rainfall . . .** (Am. Soc. of Civil Eng.), 8.3–91; **Soil and water losses in S.W. Arkansas . . .** (Bartholomew et al.), 8.3–275; **Hydromet. analysis of Danube floods** (Kallós), 8.3–276; **Ground-water levels in U.S.** (Fishel), 8.3–281; **Scattering from dielectric prolate spheroid** (Johnson), 8.3–347.

8.3–257 551.577(62) 551.585

*Hefny, M. B., **Two climatic maps of the Nile Basin and vicinity.** *Société de Géographie d'Égypte, Bulletin*, 26:183–192, Aug. **1953.** 3 maps (2 fold.), refs. **DWB**—The rainfall regime and climatic types of the Nile Basin and East Africa north of the equator based on data for 338 stations are discussed; and charts, one showing mean annual rainfall in intervals of <10, 25, 50, 75, 100 and 125 cm or greater, and another showing types of climate according to KÖPPEN (modified slightly) are presented. Data for Ethiopia, Somaliland and N. Kenya are sparse in some areas. *Subject Headings:* **1. Rainfall of Nile Basin 2. Isohyetal chart of Nile Basin 3. Climatic classification charts 4. Köppen's classification 5. Northeast Africa 6. Nile Basin.**—*M.R.*

8.3–258 551.577:551.311:631.4(673)

Henriques, José Cristóvão (*Serviços Florestais, Angola*), **A erosão profunda em Sanza-Pombo.** [Deep erosion in Sanza-Pombo.] *Agronomia Angolana*, Luanda, No. 9:121–156, **1954.** 4 photos, 2 tables. Portuguese and English summaries p. 155–56. **DWB, DA**—On p. 125–129 is a section on the climate of Sanza-Pombo in Angola, with special reference to those factors which affect soil erosion. There are available only 3 years of rainfall record for this place (1946–8), but annual rainfall is evidently about 2000 mm on the average and >3000 mm fell in 111 days during 1948. Two tables give rainfall and number of rainy days for each month of 1946–8, and coefficient of daily rainfall for each month of the 3 years. June and July are completely rainless but heavy rains fall from Oct. through April; the irregularity of the rainfall and the great intensity and duration make it ideal for deep erosion of cultivated slopes. These and other factors which combine to produce the serious condition are treated at length on the basis of field research. *Subject Headings:* **1. Soil erosion 2. Rainfall in Angola 3. Sanza-Pombo, Angola.**—*M.R.*

8.3–259 551.577:551.509.318(773)

Hiser, Homer W., **Type distributions of precipitation at selected stations in Illinois.** *American Geophysical Union, Transactions*, 37(4):421–424, Aug. **1956.** 2 figs., 4 tables, 6 refs. **DWB, DLC**—All the precipitation which fell during a ten-year period at four first-order weather stations in Illinois is classified according to its source from one of six major types of precipitation systems: (1) cold front; (2) warm front; (3) stationary front; (4) squall line; (5) warm air mass; and (6) cold air mass. The amount of precipitation and the frequency of occurrence for each of the six major types by monthly totals are presented in tabular and graphic form. Squall lines and warm air mass showers are shown to be of much greater importance at Cairo than at the stations farther north. *Subject Headings:* **1. Precipitation studies 2. Synoptic conditions for rainfall 3. Illinois.**—*Author's abstract.*

8.3–260 551.577.11

Chilingar, George V., **Cl′ and SO_4'' content of atmospheric precipitation in USSR: a summary.** *American Geophysical Union, Transactions*, 37(4):410–412, Aug. **1956.** 5 tables, 7 refs. **DWB, DLC**—The relative abundance of Cl′ and SO_4'' anions in the atmospheric precipitation of U.S.S.R. is discussed in the present summary. In addition, the amounts of HCO_3', NO_3', $Na\cdot$, $Ca\cdot\cdot$, $Mg\cdot\cdot$, and $NH_4\cdot$ ions in the atmospheric precipitation are also presented. Review of the Russian literature indicates that the average SO_4'' content of atmospheric precipitation in U.S.S.R. is about twice as high as that of Cl′ anion. This leads to a conclusion that the major portion of SO_4'' anions is not of marine origin. *Subject Headings:* **1. Precipitation composition 2. U.S.S.R.**—*Author's abstract.*

8.3–261 551.577.11:546.17:551.594.25

*Mukherjee, Asoke Kumar (*Met. Office, Jodhpur*), **Thunderstorm and fixation of nitrogen in rain.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(1):57–60, Jan. **1955.** 3 tables, 8 refs., 2 eqs. **DWB, DLC**—Recent determinations of the nitrates and ammonia in rain water in Sweden (ANGSTRÖM and HOGBERG, 1952) has led to the conclusion that thunder, i.e., electrical spark discharges in the atmosphere, is not the determining factor in the production of nitrogen compounds formed in rain water. In the light of the above conclusion, available data of combined nitrogen in rain water in Sylhet, East Pakistan in 1933 and Bombay, India in 1939 have been examined. It supports the conclusions reached by Swedish workers. *Subject Headings:* **1. Nitrogen content of precipitation 2. Electricity of precipitation 3. Sweden. I. Ångström, A.**—*Author's abstract.*

8.3–262 551.577.11:551.594.12

Voronkov, P. P., **O nekotorykh zakonomernostiakh formirovaniia khimicheskogo sostava atmosfernykh osadkov.** [Some principles of the formation of the chemical constituent of atmospheric precipitation.] *Akademiia Nauk SSSR, Doklady*, Moscow, 98(5):765–768, Oct. 11, **1954.** table, 12 refs. **DLC**—Evidence is presented showing that the principal source of Cl^- ions for atmospheric precipitation in the northern regions of the U.S.S.R. are the very small NaCl condensation nuclei. This explains the small or more or less constant Cl^- ion content of the atmospheric precipitation and of the surface waters. The concentration of SO_4^{--} ions depends upon the atmospheric pollution with SO_2 and is hence more variable. The constancy of Cl^- ions is explained by precipitation forming processes of condensation or coagulation. The variation of other ions and the increase in Cl^- ions depend upon the washing out of pollutants from the atmosphere. *Subject Headings:* **1. Precipitation chemistry 2. Ion production 3. U.S.S.R.**—*I.L.D.*

8.3–263 551.577.2(52)

§*Yamamoto, S., **On the rainfall amount and water level in the upper region of the river "Ishikari."** *Journal of Meteorological Research*, Tokyo, 5(10/12):794–800, Jan. **1954.** 3 figs., 4 tables, 4 refs. In Japanese; English summary p. 794. **MH-BH**—From the records of 6 self-registering rain gages and 3 water level gages, 1) It is not always true that rainfall amount is greater in mountainous region. 2) In case of the rainfall of cold front type the rainfall amount is generally greater in the mountainous region than in the plain, and in the rainfall of warm front type it is the reverse. 3) The phase of rainfall shifts regularly from west to east and the time difference between Asahikawa and Makunbetsu is about 2 hours. 4) The beginning time of rainfall and the maximum water level at Asahikawa are investigated in terms of rainfall amount, and it seems there exists a certain relationship between them. *Subject Headings:* **1. Rainfall amount 2. Orographic rainfall 3. Rainfall distribution 4. Rainfall-runoff relationships 5. Ishikari River, Japan.**—*Author's abstract.*

8.3–264 551.577.2:551.584.42

Yokota, Ren-ichi (*Faculty of Agric., Tottori Univ.*), **The rate of the amount of rain falling to the roots under the stems and leaves of crops.** *Journal of Agricultural Meteorology*, Tokyo, 8(12):31–32, March **1953.** 2 figs., 2 tables. In Japanese; English summary p. 32.—The percentage of amount of rain actually reaching the roots of growing crops of that falling on entire crops may be expressed by the formula $y=a-Cx^3$, where x number of days after the germination of the crops. *Subject Heading:* **1. Rainfall penetration through crops.**—*Based on author's abstract.*

8.3–265 551.577.21 551.582(569)

*Lebanon. Service de Climatologie, **Carte pluviométrique du Liban an 1/200.000e. Avec aperçu sur les facteurs du climat (par Jean Rey).** [Rainfall map of Lebanon on scale 1/200,000. With a sketch on the factors of climate (by Jean Rey).] Ksara, Liban, **1955.** Text, 26 p. 11 figs., tables, 8 refs. Separate map 72×96 cm. in color, printed Paris, Institut Geographique National, **1955. DWB**—This is a beautifully colored wall chart of Lebanon and West Syria, showing average amount isohyets for every 100 mm from <200 mm to >1500 mm, the actual

values for each rainfall station (196 mm at Damascus, 1594.5 mm at Machghara). Eight colors are used for 8 intervals, and the map is on heavy, durable paper. The text explains the map and tells about the climate of Lebanon, the orographic and marine-continental effects, temperature, sunshine, evaporation, precipitation, anomalies in precipitation in Lebanon and the Anti-Lebanon range—effect of altitude and aspect, etc. As an inset on the chart, histograms or graphs showing monthly precipitation distribution (maximum, mean and minimum) relative humidity, cloudiness and temperature are included, and wind roses for Beyrouth, Ksara and El Mina (Tripolis). *Subject Headings:* **1. Climate of Lebanon 2. Isohyetal chart of Lebanon 3. Lebanon. I. Rey, Jean.**—*M.R.*

8.3–266 551.577.32:551.589.1(52)

Yoshida, Chuko, **The Shūrin.** *Journal of Meteorological Research*, Tokyo, 6(7):277–285, Sept. **1954.** 10 figs., 8 refs. In Japanese; English summary p. 277. **DWB**—In the present paper rainfall interval and intensity of the "shurin" (rainy season from summer to autumn) at Fushiki are statistically investigated, and it follows the the shūrin has some close relations to the behavior of continental airmass and solar activity. *Subject Headings:* **1. Rainy seasons 2. Shurin 3. Air mass climatology 4. Japan.**—*Author's abstract.*

RAIN AND SNOW

See also: **Snow hydrology** (U. S. Corps, Engr.), 8.3–14; **Rainwater, mineral composition** (Larson), 8.3–132; **Fogs and snow, Greenland Ice Cap** (Lauer et al.), 8.3–242; **Growth of cloud droplets by coalescence** (Basu and Das), 8.3–243; **Coalescence of drops in clouds** (Best), 8.3–244; **Comparison of drop-size distributions in clouds and rain** (Boucher and Bartnoff), 8.3–246; **Stratiform cloud with drizzle** (Mook), 8.3–256; bibliog. on **Specialized Forecasting,** p. 372–401.

8.3–267 551.578.11

Krishna Rao, P. R. and Ganesan, V. (*Reg. Met. Centre, Madras*), **Rain from non-freezing clouds over Madras.** (In: Symposium on Artificial Rain, New Delhi, Feb. 1953, **Proceedings and Papers.** pub. **1955.** p. 33–39. photo., table, 4 refs.) **DWB**—An examination of the data provided by airplane meteorological flights made twice daily by the R.A.F. at Madras in the year 1944–46 and the weather diary maintained at the ground station shows a number of instances when rain occurred from clouds which did not extend above the freezing level. Such instances of rain from nonfreezing clouds during the northeast monsoon seasons of 1944 and 1945 have been collected and details of the height and temperature of base and top of the clouds and thickness of the clouds, freezing level, etc., have been given. The clouds were mostly cumulus and the precipitation was in the nature of showers or light or moderate rain. Showers and moderate rain occurred from cumulus clouds of 4000 ft. or more thickness. An interesting example of rain from non-freezing clouds near Masulipatam, reported by airline pilots in the field of a cyclonic storm which had weakened into a depression, has been given. Two photographs of rain falling from a growing cumulus cloud which was below the freezing level are appended. *Subject Headings:* **1. Rain from nonfreezing clouds 2. Madras, India.** —*Authors' abstract.*

8.3–268 551.578.11:531.32

Pearcey, T. and Hill, G. W. (*both, Div. of Radiophysics, C.S.I.R.O., Univ. Grounds, Sydney*), **The accelerated motion of droplets and bubbles.** *Australian Journal of Physics*, Melbourne, 9(1):19–30, March **1956.** 2 figs., 2 tables, 3 refs., eqs. **DLC**—The drag force acting upon small particles such as droplets and bubbles, moving through a viscous medium, depends upon the rate of change of the state of motion of the medium and upon the diffusion of vorticity from the surface of the particle. For accelerated particles the drag force changes with time and depends upon all previous accelerations. The equation of motion of a particle takes the form of an integro-differential equation, which has been solved numerically in the case of deceleration to rest from uniform motion with no impressed body forces. In any experiments designed according to the principles of dynamical similarity, the ratios of viscosities

and densities of the medium and the particle must be maintained constant in the scale transformations involved. *Subject Headings:* **1. Drop velocities 2. Particle dynamics.**—*Authors' abstract.*

8.3–269 551.578.46

de Quervain, M., **Von der schweizerischen Schnee- und Lawinenforschung.** [Snow and avalanche research in Switzerland.] *Sonnblick-Verein, Vienna, Jahresbericht,* 49/50:8–12, 1951–1952, pub. **1954.** 4 photos. **DLC**—The principal activities of the Swiss Institute of Snow and Avalanche Research (Weissfluhjoch, el. 2670 m) are outlined. They include regular observations of snow cover, meteorological and hydrological observations, research in snow mechanics, avalanche forecasting, avalanche protection, and some special problems like rime formation and hail. Among the Institute's facilities two cold chambers, a standard experimental site, snow-pressure meters and trial structures for avalanche protection are mentioned. *Subject Headings:* **1. Avalanche research 2. Snow research 3. Switzerland.**—*G.T.*

8.3–270 551.578.46:551.509.5:551.579

Hopkins, Bryant L., **Use of snow surveys in volumetric prediction of run-off.** *Eastern Snow Conference, Proceedings,* v. 2:22–25, **1953–1954.** table. **DWB**—Shows how spring-time runoff is connected with the snow water content on 1 March and the precipitation after this date up to the time when a runoff of 1 cls per sq mi is reached. The apparent water loss is relatively consistent, except in cases of dry fall conditions, when the ground water resources have to be replenished. *Subject Headings:* **1. Snowmelt runoff 2. Runoff forecasting 3. Kennebec River, Maine.**—*A.A.*

8.3–271 551.578.46:551.43

*Juillard, Etienne (*Strasbourg Univ.*), **L'enneigement dans les Vosges et dans la plaine d'Alsace: étude météorologique.** [Snow cover in the Vosges and in the Alsace plain: meteorological study.] *Strasbourg, Université. Faculté des Sciences. Institut de Physique du Globe, Annales, n.s., Pt.* 3, *Géophysique,* 7:3–21, [1942?]. pub. **1954.** tables, figs., 13 refs. **DWB, DLC**—Snow cover variations, duration of snow cover, effects of snow on geomorphology, hydrology, agriculture and human activities based on entire record at 23 stations (145–1360 m) comprises this nearly monographic paper. The data are analyzed, discussed and presented in tables and on complex graphs. One set of curves show dramatically the difference in snow cover throughout the winter at different elevations in the Vosges region during 1906–07, a very snowy winter and in 1927–8, a snow-free winter. Effects of elevation under different aspects, temperature, density, nivometric coefficient, etc. are treated. *Subject Headings:* **1. Snow cover variations 2. Orographic effects on snow cover 3. Vosges Mountains, France.**—*M.R.*

8.3–272 551.578.46:551.556

Shiotani, Masao and Arai, Hideo, **Studies on mechanism of snow control of the shelterbelt, Pt. 2. Experimental studies.** *Seppyo* (*Snow and Ice*), Tokyo, 16(1):28–33, Sept. **1954.** 11 figs., 2 tables. In Japanese; English summary p. 33. **DWB**—In the first report (not seen), preliminary notes on the mechanism of snow control are briefly discussed to help the reader in correct understanding of the following experimental data on shelterbelt: these are vertical distributions of snow in a fully developed snowstorm, generation of snow drift around obstacles standing on the snow cover, and both vegetational factors (width, height, crown density and height to the crown base) and meteorological ones (wind velocity and snow). Experiments on model shelterbelt in the wind tunnel are made by varying other factors except one under a controllable condition. In the second report, experimental studies which were carried on during the winter of 1952–53 on the coast of the Japan Sea in the northern district of Honshu are presented. Two experimental forests are used: one is the Snow Protection Forest of the Japanese National Railways (Japanese Cedar, 34 m wide and 5 m high with crown density 0.63), and the other is a sham forest consisting of 3 m boughs of Spruce with crown diameter 2 m, stuck into the ground at 2 m intervals (30 m wide with crown density 0.54). Measurements are made on a number of entities which seem to have a close relation to the snow drift

prevention. Decrease of wind velocities both in the windward and vertical directions, accumulation of snow within and around the forest, equivalent depth of snow deposit after a snow-storm and drifting snow near the snow cover are present, in that order. The authors discuss further studies required to clarify the mechanism of snow control and to decide the effect of shelterbelt. These subjects are statistical studies on the snow-storm, reasonable definition of the density of the forest and so on. *Subject Headings:* **1. Shelter belts 2. Snow control 3. Snow drifts 4. Forest influences 5. Japan.**—*Authors' abstract.*

8.3–273 551.578.46

Shoda, Mikio, **Chronological table of researches on deposited snow.** *Researches on Snow and Ice*, Tokyo, No. 1, Nov. **1953.** 1 (fold sheet), following p. 226. Both in Japanese. **DWB.** Also in: *Seppyo* (*Snow and Ice*), Tokyo, 13(4), page following p. 124, **1952. DWB**—This chronological table on the Japanese studies on the snow cover will also give a clear bird's eye view on the several research facilities for the physics and mechanics of snow and ice. Besides universities and weather bureaus, there are so many official and commercial facilities which suffer economical damage from snow cover, such as forestry, agriculture, highway, railroad service, communication, etc; and they cooperated in this field of research. *Subject Headings:* **1. Snow cover research 2. Snow cover Mechanics 3. Japan.**—*H. Arakawa.*

HYDROMETEOROLOGY

See also: **Snow hydrology** (U. S. Corps, Engr.), 8.3–14; **Hydromet. service, U.S.S.R.** (Kejla), 8.3–52; **Measuring velocities of small streams** (Zababurin), 8.3–116; **Runoff forecasting** (Hopkins), 8.3–270.

8.3–274 551.579:519.2

Alekseev, G. A., **O formulakh dlia vychisleniia obespechennosti gidrologicheskikh velichin.** [Formulas for calculating the reliability of hydrologic values.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:40–43, Nov./Dec. **1955.** 4 refs., 13 eqs. **DWB, DLC**—The author discusses four formulas for calculating empirically the probability of exceeding observed hydrologic values. These formulas

$$P_m = \frac{m}{n}, \qquad P_m = \frac{m-0.5}{n}, \qquad P_m = \frac{m}{n+1} \qquad \text{and} \qquad P_m = \frac{m-0.03}{n+0.4},$$

where n = total observed statistical series, m = ordinal number of numbers of the series. The preferability of these formulas in theoretical and practical relationship is examined and the derivation of the latter two is presented. *Subject Headings:* **1. Hydrologic formulas 2. Probability.**—*I.L.D.*

8.3–275 551.579:551.577:631.4

*Bartholomew, R. P.; Hinkle, D. A. and Engler, Kyle, **Soil and water losses in Southwest Arkansas as influenced by rainfall characteristics and soil management practices.** *Arkansas. Agricultural Experiment Station, Fayetteville, Bulletin*, No. 550, April **1955.** 47 p. 10+3 tables, 7 refs. **DWB**—Rainfall, runoff, soil moisture, erosion and crop data are analyzed for 1936–1950 for the Fruit and Truck Branch Experiment Station near Hope, Arkansas, to determine the effect of crops and cultivation practices on water losses. Self-recording (Ferguson) rain gages gave continuous records which are analyzed for intensity, amount, duration, frequency, and plot, and data are given *in extenso*, for each separate rain and for various periods. Plowing and vegetative cover definitely reduced water losses. As high at 50% of the rainfall was lost through runoff in unprotected or unplowed plots. Soil losses are closely related to water losses, but in July–Sept. exceed water losses. *Subject Headings:* **1. Rainfall-runoff relationships 2. Soil erosion 3. Rainfall data analysis 4. Hope, Arkansas.**—*M.R.*

8.3–276 551.579.4:551.577.37:551.509.3(282.243)

Kallós, Imre, **A dunai árhullámok hidrometeorológiai vizsgálata.** [Hydrometeorological analysis of Danube floods.] *Időjárás*, Budapest, 59(6):331–338, Nov./Dec. **1955.** 8 figs.,

table, 8 refs. Russian and German summaries p. 331. **DWB, DLC**—Discharge data for the Danube (Regensburg to Mohacs) are presented for the floods of July 1954 and July 1955 along with precipitation data for the flood- producing areas (Germany, Austria, Czechoslovakia and Hungary), and general synoptic charts of Europe. Summer floods of the Danube appear to be caused by depressions whose rear-side isobars are situated meridionally over the Alps Seven earlier summer floods confirm this conclusion. *Subject Headings:* **1. Floods 2. Heavy rains 3. Synoptic studies 4. Danube Basin.**—*G.T.*

8.3–277 551.579.4

Langbein, W. B. and Hardison, C. H. (*both, U. S. Geological Survey, Wash., D. C.*), **Extending streamflow data.** *American Society of Civil Engineers, Proceedings*, Vol. 81, Paper No. 826, Nov. **1955.** 13 p. 4 figs., 7 refs. **DWB, DLC**—Inadequate length and number of streamflow records are common deficiencies in the design of water projects. A solution to the problem of providing more coverage may be approached by applying the recognized correlation between the discharges of nearby streams, similarly situated. Correlations developed by graphic plots of contemporaneous monthly discharges, generally confirm those based on daily data. Graphs of best fit are drawn to an "engineers" line rather than a least squares regression. Correlation coefficients (r) are nearly always greater than 0.8; theory indicates that extending data by correlation is profitable wherever r exceeds 0.44 and one record is at least 25% longer than the short record. Correlative estimates obtained by the methods described contain the variability, group distribution, and other significant characteristics of an actual record, and therefore provide useful information on water resources design and appraisal. As demands for information mount, an increasing part of the stream-gaging program may be devoted to the operation of secondary or roving stations that are satellite to a firm network of long-term base stations. *Subject Headings:* **1. Stream flow 2. River discharge 3. Correlation coefficients.** —*Authors' abstract.*

8.3–278 551.579.4(523):551.509.54

Yamamoto, Tsuneo, **On the flood forecasting of the River Watari.** *Journal of Meteorological Research*, Tokyo, 6(8):401–404, Nov. **1954.** 5 figs., 8 tables, 3 refs. In Japanese. **DWB**—After describing characteristics of the flood and flood waves in the Watari Basin, the author makes a statistical study to find the relation between the height of flood waves and the areal rainfall. *Subject Headings:* **1. Flood forecasting 2. Watari River, Japan.**—*H. Arakawa.*

8.3–279 551.579.4

*Zaĭkov, B. D., **Vysokie polovod'ia i pavodki na rekakh SSSR za istoricheskoe vremia.** [Spring floods and high water levels on the rivers of U.S.S.R. in historical times.] Leningrad, Gidrometizdat., **1954.** 133 p. 16 figs., 18 tables, 6 refs. **DLC**—A detailed and comprehensive monograph containing detailed data and descriptions of the annual high water levels of those rivers of the Soviet Union with the longest record (for the northern Dvina near Arkhangel'sk the period of record is 1752–1952) and data on high water levels and spring floods for the rivers in the various river basins of both European and Asiatic Russia. Tables and data on water levels and chronological accounts for each river are included. *Subject Headings:* **1. Spring floods 2. U.S.S.R.**—*I.L.D.*

8.3–280 551.579.4

Zhelezniak, I. A., **Ob opredelenii prodolzhitel'nosti vesennego polovod'ia.** [Determining the duration of the spring flood.] *Meteorologiia i Gidrologiia*, No. 2:35–36, March/April **1955.** fig., table, 2 refs., 3 eqs. **DLC**—Empirical formulas are devised for representing the mean duration of spring floods in the rivers of the Ukranian S.S.R. *Subject Headings:* **1. Flood duration 2. Spring floods 3. Ukranian S.S.R.**—*I.L.D.*

8.3–281 551.579.5:551.577.38:628.1(73)

Fishel, V. C., **Long-term trends of ground-water levels in the United States.** *American Geophysical Union, Transactions*, 37(4):429–435, Aug. **1956.** 7 figs., 2 tables, 9 refs. **DWB, DLC**—Ground-water levels at the end of 1954 were at or near record-low stages throughout

ost of the southern two-thirds of the U. S. These low stages, like those of the early 1930's, ve led to frequent expression of the opinion that the water table throughout the country is ntinuously falling and that we are gradually exhausting our ground-water supplies. A good cord of changes in ground-water levels is being obtained by the U. S. Geological Survey and operating State agencies from periodical measurements of water levels in nearly 20,000 servation wells. The records of some of these wells extend back 50 years. Many records e available for the period beginning in 1934. These long-term records indicate that in some eas the ground-water supply is overdeveloped. In the great majority of areas, however, the age of the water levels correlates with the precipitation. Much of the country has been in ought and the water levels are at a low stage. As the precipitation increases, as it is bound do later, the water levels will return to higher stages. *Subject Headings:* **1. Ground water riations 2. Water supply 3. Drought effect 4. United States.**—*Author's abstract.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: **Met. bulletin** (Zagreb), 8.3–102.

8.3–282 551.58:06

K—, Z., **Konferencja klimatologiczna we Wroclawiu, w dniach 26 i 27 marca 1954 r.** Climatological conference at Wroclaw, March 26–27, 1954.] *Przegląd Geograficzny*, Warsaw, (1):226–233, **1955.** 5 refs. **DLC**—Minutes of a climatological conference held on March –27, 1954 at Wroclaw, attended by 111 representatives. Topics of the most important ports are: **The state of Polish climatology,** by E. Stenz and A. Schmuck, and **The tasks of olish climatology and the organization of climatological investigations,** by A. Kosiba, W. kolowicz and W. Zinkiewicz The addresses were followed by lengthy discussions. In mming up the results of the conference, the author points out that no critical evaluation of hievements of Polish climatology has been made and no proposals about the methods and tent of further investigations have been offered. *Subject Headings:* **1. Climatology conrences 2. Climatology of Poland 3. Poland.**—*A.M.P.*

8.3–283 551.58

Kosiba, Aleksander, **O niektórych zagadnieniach klimatologii polskiej.** [Some problems. Polish climatology.] *Przegląd Geograficzny*, Warsaw, 27(1):17–37, **1955.** Russian and nglish summaries p. 34–37. **DLC**—A number of methodological problems which came to ght in the discussion of the tasks of Polish climatology are examined with the object of nding the best answer to how to avoid shortcomings, mainly, in the fields of: processing of ata concerning the climate of Poland; the classification of meteorological stations, as regards the degree to which each station is representative; the introduction of questionnaire-forms r the recording by geography teachers and pupils of sporadic, but important, meteorological henomena; the establishment of microclimatic research methods; the determination of iteria for characterizing the macro-, micro, agro- and bio-climate and climatic changes; search on the water balance especially from the viewpoint of the snow cover, and evaporation. ome information on the fact that winters in Poland have become distinctly warmer, leading a reduction of the snow cover, is followed by an explanation of the causes of the phenomenon. *ubject Headings:* **1. Problems in climatology 2. Climatology 3. Poland.**—*A.M.P.*

CLIMATE OF PARTICULAR PLACES

See also: **Antarctic, Argentine sector** (Cordini), 8.3–10; **Climate, Arctic, Soviet sector** (Leont'eva), 8.3–11; **Climate and weather, Antarctica** (Tauber), 8.3–12; **Climatological tables, India** (India. Met. Dept.), 8.3–19; **Climate of Tunisia** (Tunis. Met. Service), 8.3–24; **Rainfall map of Lebanon** (Lebanon. Serv. de Climatologie), 8.3–265.

8.3–284 551.582:551.585.5(57)

†Jackson, W. A. Douglas (*Univ. of Wash., Seattle*), **The virgin and idle lands of Western iberia and northern Kazakhstan: a geographical appraisal.** *Geographical Review*, N. Y.,

46(1):1–19, Jan. **1956.** 3 figs., 5 tables, 52 refs. **DLC, DWB**—This article contains a description of the climate of the steppe and forest steppe of western Siberia and northern Kazakhstan accompanied by a table giving mean monthly temperatures and precipitation for selected stations in the steppe and forest steppe regions, and a map with isotherms of mean July temperatures and isohyets of mean May–July precipitation. *Subject Headings:* **1. Climatic surveys 2. Steppes 3. Siberia 4. Kazakhstan.**—*I.L.D.*

8.3–285 551.582(438)

Kozłowska, Teresa, **Regionalne opracowanie klimatu Polski.** [Regional analysis of the climate of Poland.] *Przegląd Geograficzny*, Warsaw, 27(1):117–124, **1955.** fig., 21 refs. **DLC**—A survey of 16 papers presenting regional analyses and studies of the climate of Poland is presented. It is shown that the majority of them deal with the climate of regions adjoining the Baltic Sea and the western border line of Silesia. There is a complete lack of such studies dealing with the central part of Poland. *Subject Headings:* **1. Climate of Poland 2. Regional climatology 3. Climatic studies 4. Poland.**—*A.M.P.*

8.3–286 551.582(72)

*Vivó, Jorge Abilio, **Geografía de México.** [Geography of Mexico.] Mexico, Fondo de Cultura Económica, **1953.** 3rd ed. corrected and enl. 338 p. 37 photos, numerous charts (many fold.), graphs, tables. Ch. 5, **Climas,** p. 56–85. 14 charts. **DLC, DPU**—The chapter on climate of Mexico is a up-to-date and informative treatment in condensed form, with discussion and numerous isopleth charts of temperature, precipitation, pressure, wind, cloudiness and humidity, charts showing storm tracks for Jan. and July (1936–40), and charts of general circulation (boundaries of trades, intertropical front, air masses and mean air flow in summer and winter). A few pages are devoted to the major climatic types of Mexico using Köppen system. The author, together with José C. Gomez, published a textbook on the **Climatología de Mexico** in 1946. (*See* 3.4–228, April 1952, *MAB.*) *Subject Headings:* **1. Climate of Mexico 2. Mexico.**—*M.R.*

8.3–287 551.582.1(94)

*Australia. Bureau of Census and Statistics, **Official Year Book of the Commonwealth of Australia, Vol. 41, 1955.** Canberra, **1956.** 1186 p. p. 13–41, **Climate and Meteorology of Australia.** 4 charts (some fold.), tables, foot-refs. **DWB**—The article in this yearbook (written by the Director of the Commonwealth Meteorological Bureau) gives data and an analysis of the temperature, rainfall, snow, hail, pressure, wind, monsoons, cyclones, influence of forests and comfort zones in various provinces or regions of Australia. Climatic tables for Perth, Darwin, Adelaide, Brisbane, Sydney, Canberra, Melbourne and Hobart present usual data including sunshine, humidity, fog, vapor pressure, evaporation, thunderstorms; and excellent charts of effective temperature, extreme temperature, range, duration of longest heat wave (maximum >100°F), frost-free period, evaporation, annual and monthly rainfall and wind roses (9 a.m. and 3 p.m.) for many places in the Commonwealth are given. *Subject Headings:* **1. Climate of Australia 2. Australia.**—*M.R.*

8.3–288 551.582.1(756)

*Carney, Charles Borromeo (*U. S. W. B., Raleigh, N. C.*), **Weather and climate in North Carolina.** *North Carolina. Agricultural Experiment Station, Bulletin*, No. 396, Oct. **1955.** 47 p. 16 figs., 5 tables, 9 refs. **DWB**—Climatic controls (elevation, latitude, continent, ocean) affecting North Carolina seasonal weather, temperature, frost, precipitation, evaporation, drought, wind, sunshine, radiation, humidity, climate and comfort, hurricanes, and tornadoes are discussed in separate sections, with supporting data and illustrations (photographs, state and U. S. isarithm charts, comfort charts, etc.). *Subject Headings:* **1. Climate of North Carolina 2. North Carolina.**—*M.R.*

8.3–289 551.582.1(517)

†Murzaev, Ed. M., **Mongol'skaia Narodnaia Respublika.** [Mongolian Peoples' Republic.] Moscow, Gos. Izdat. Geogr. Lit., **1948.** 313 p. figs. (incl. photos), 5 maps (fold.), tables. bibliog. p. 293–302. **DLC.** p. 91–115, **Klimat.** [Climate]. Translation into English of Section on Climate is issued as *U. S. Quartermaster Corps. Research and Development Branch, Environmental Protection Section, Special Report,* No. 32, March 1, **1950,** with title **The Climate of Mongolia.** Translated by George S. Mitchell. 22 p. 2 figs., table, 26 refs. **DWB**—Chapter on "Climate" contains the basic data on climate presented graphically on temperature variations (6 stations) and on precipitation (5 stations), derived from observations during 1937–1943. Schematic map of mean annual precipitation distribution shows four zones. In general the climate is very continental. Sharp climatic differences can be found even inside small regions caused by orographic and hypsometric conditions. Clear sky prevails, especially in the cold season. Low humidity and scarce precipitation with a cold and long winter, with large temperature amplitudes and a rapid change of seasons are characteristic. The center of the global maximum of atmospheric pressure is found in Mongolia. Here is also found the most southern extension of permafrost and the most northern extension of dry desert. Many interesting details of general and seasonal aspects of climate are discussed and characteristics of extreme conditions are cited. *Subject Headings:* **1. Climate of Mongolian Republic 2. Mongolia. I. Mitchell, George S.** (*trans.*).—*N. A. Zikeev.*

8.3–290 551.582.1:551.586:63(675)

Robert, J.-L., **Monographie agricole du District du Lac Léopold II: l'agriculture actuelle, son avenir.** [Agricultural monograph on the Lake Leopold II District: the present and future of agriculture.] *Belgium. Direction de l'Agriculture, des Forêts, de l'Elevage et de la Colonisation, Bulletin Agricole du Congo Belge,* 43(3):617–696, Sept. **1952.** 12 figs., tables, refs. In French; Flemish summary p. 694–696. **DWB**—This study on the geography, soil properties, vegetation and agriculture of the district under review includes a chapter on climate (p. 626–635) consisting of rainfall tables by MICHEL and VANDENPLAS, and brief comments thereon. The tables give monthly average rainfall amounts, number of rainy days and maximum values for the periods 1929–1939 (11 stations) and 1940–1949 (9 stations), as well as the annual variation of rainfall by decades for each of the years 1946 through 1952, at Inongo. *Subject Headings:* **1. Climate of the Belgian Congo 2. Rainfall variations 3. Agricultural meteorology 4. Belgian Congo.**—*G. T.*

8.3–291 551.582.2:551.586:63(673)

Contribuição para o estudio agricola do Vale do Cunene. [Contribution to the agricultural study of the Cunene Valley.] *Agronomia Angolana,* Luanda, No. 8, **1953.** 182 p. p. 13, **Climatic aspects;** p. 41, **Necessity of meteorological post and equipment;** p. 48, **Soil and climate;** p. 76–78, **Temperature tables, and comments;** p. 98–99, Temperature tables. **DWB, DLC**—In these reports from the Cunena Valley Experiment Station in Angola, there is a general description of rainfall, temperature, and humidity conditions, based on data for 1942–7 (p. 13–14), following a more detailed analysis and presentation of average monthly data on wind direction, air and soil temperature, evaporation and precipitation (p. 48–50, 76–78 and 98–99) for 1950, 1951, and 1952, respectively. *Subject Headings:* **1. Agro-climatic data 2. Climate of Cunena Valley, Angola 3. Cunena Valley, Angola. I. Mirrado, João H. M.** —*M.R.*

8.3–292 551.582.2(673)

*Angola. Serviço Meteorológico, **O clima de Angola.** [Climate of Angola.] Luanda, Angola, Serviço Meteorólogico, **1955.** 53 p. fig., 3 (fold.) maps, 39 tables. **DWB**—Averages of meteorological data for 31 climatic and 22 rainfall stations in Angola are tabulated and discussed in text. Colored charts (3) show climatic zones according to KÖPPEN and THORNTHWAITE and mean annual isotherms for country. Usual climatic data tables include averages from 1901 to 1952 (Luanda) or for shorter periods. History of service, climate of country as a whole and of regions, elements (pressure, temperature, relative humidity, wind, cloudiness,

sunshine, evaporation, precipitation and hydrometeors) are discussed in text. *Subject Headings:* **1. Climatic data 2. Climatic zones 3. Climatic classifications 4. Climate of Angola 5. Angola. I. Leal, Fernando.**—*M.R.*

CLIMATIC CHANGES

See also: **Dendroclimatic changes in semiarid America** (Schulman), 8.3–13.

8.3–293 551.583.14:551.526.6(7)

Rodewald, Martin, **Beiträge zur Klimaschwankung im Meere. 5 Beitrag. Die rezente Erwärmung der atlantischen Küstengewässer Nordamerikas. 6. Beitr. Die Temperaturen der pazifischen Küstengewässer Nordamerikas von 1920 bis 1951.** [Contributions to marine climatic oscillations; Pt. 5. The recent warming of the Atlantic coastal waters of North America. Pt. 6. Temperatures of the Pacific coastal water of North America, 1920–1951.] *Deutsche Hydrographische Zeitschrift*, 9(4):182–188, **1956.** 2 figs., 3 tables, 6 refs. German, English and French summaries p. 182–183, 187. **DWB**—Five-year values of sea surface temperature for 13 east coast stations show that from Eastport, Me. to Ft. Pulaski, Ga. 1950–54 was the warmest, exceeding the normal by 0.7°C. From Pensacola to Key West 1950–54 was below normal. Overlapping 10-year means of Jan. air temperature at New York 1880–1954 show a cycle of about 20 years with progressively higher peaks and troughs. In the second note 5-year means of surface temperature at west coast stations between Seward and La Jolla show no trend or a fall in the last 7 years. *Subject Headings:* **1. Climatic trends 2. Sea temperature variations 3. North American coastal waters.**—*C.E.P.B.*

8.3–294 551.583.3

†Guillien, Yves, **La couverture végétale de l'Europe pléistocène.** [Vegetation in Pleistocene Europe.] *Annales de Géographie*, Paris, 64(344):241–276, July/Aug. **1955.** 9 figs., 10 plates (photos), 2 tables, refs., biblio. p. 276. **DLC**—The 9 climatic periods evident in the upper Pleistocene, of series studied, are tabulated on p. 257 with respect to vegetation types of Europe. Pollen analysis provides the basis for most of the discussion. Numerous data are shown in graphs. *Subject Headings:* **1. Pleistocene climate 2. Pollen analysis 3. Europe.** —*M.R.*

8.3–295 551.583.3:551.352:593.12

Ovey, Cameron D., **On the validity and use of planktonic foraminifera in the interpretation of past climatic changes from a study of deep-sea cores.** *Geologische Rundschau*, Stuttgart, 40(1):31–33, **1952.** refs. **DLC**—Short review of interpretation of planktonic foraminifera in 20 m cores of ooze from Atlantic in terms of Pleistocene temperature changes. *Subject Headings:* **1. Quaternary climates 2. Oceanic sediments 3. Foraminifera.**—*C.E.P.B.*

8.3–296 551.583.3:582

Pike, K. and Godwin, H., **The interglacial at Clacton-on-Sea, Essex.** *Geological Society of London, Quarterly Journal*, 108(3):261–272, **1953.** plate, 2 tables, 31 refs. **DLC**—Pollen analyses indicate a warm temperate forest period followed by decreasing temperature with coniferous forest. Suggested age, last half of Penultimate Interglacial. *Subject Headings:* **1. Pollen analysis 2. Quaternary climates.**—*C.E.P.B.*

8.3–297 551.583.3:551.311.15

Pratje, Otto, **Die Deutung der Steingründe in der Nordsee als Endmoränen.** [The interpretation of the stony grounds in the North Sea as end moraines.] *Deutsche Hydrographische Zeitschrift*, 4(3):106–114, **1951.** 6 figs., 13 refs. German, English and French summaries p. 106. **DWB**—Stony banks in the North Sea are interpreted as moraines and the marine limits of three stages of last Scandinavian glaciation traced. *Subject Headings:* **1. Glaciation 2. North Sea.**—*C.E.P.B.*

MICROCLIMATOLOGY

See also: **Land, air, ocean** (Beckinsale), 8.3–6; **Microclimatic observations, Angora and Lena river basins** (Galakhov), 8.3–99; **Mobile micromet. station** (Superior), 8.3–105; **Met. instruments . . .** (Grinnell), 8.3–112; **Bacterial air contamination** (Zubarev), 8.3–141; **Slope temp. variations, Mt. Neko, Negano Prefecture** (Yoshino), 8.3–188; **Nucleus content of air in occupied rooms** (Burke), 8.3–247; **Rainfall penetration through crops** (Yokota), 8.3–264; **Conductivity of air in sealed rooms** (Belon), 8.3–329.

8.3–298 551.584.33

Galakhov, N. N., **Klimat srednego Priangar'ia i basseĭna verkhneĭ Leny.** [The climate f the middle Angara River region and the Upper Lena River Basin.] *Akademiia Nauk SSR. Institut Geografii, Trudy,* No. 64:160–172, **1955.** 4 figs., table, 11 refs. **DLC**—This escription of the macroclimate of the middle Angara and of the upper basin of the Lena River ontains an account of the general circulation of this area and of the seasonal variation of the neteorological variables. Numerical values of the individual meteorological values are nterspersed throughout the discussion and a map showing the distribution of the coefficient f continentality, a map giving the area covered by fires in 1915, a photograph showing fog in he Lena plain, a table giving data on the duration of the seasons and their phases and raphs showing the frequency of different classes and types of weather are included. *Subject Headings:* **1. Microclimatology 2. Seasonal variations 3. Angara River Basin 4. Lena River Basin.**—*I.L.D.*

8.3–299 551.584.42:633.18:631.67

Kaneseki, S. (*Naniwa Univ.*), **The areas which were exposed to the direct solar radiation t the water on ground surfaces of the paddy fields planted by the different methods, and hermal conditions in those fields.** *Journal of Agricultural Meteorology,* Tokyo, 10(3/4):96–00, March **1955.** 5 figs., 4 tables, 7 refs. In Japanese; English summary p. 100. **DWB**—The shadows of a representative waterfield rice plant falling on the surface of the paddy field aused by the direct solar radiation were photographed. An attempt was made to measure he relative values of the areas exposed to direct solar radiation at the surfaces of the paddy elds planted by the different methods. The daily extreme temperature of soil (5 cm below he soil surface), soil surface, water (center of water layer, i.e., 1.5 cm for fields 1–4 or 4.5 cm or field 5,6 below the water surface), air (10 cm above the water or soil surface) and also the iurnal course of the water temperature in each field were occasionally observed during the rowing period of the waterfield rice plant (the extreme temperature of soil, soil surface and ir in the field 5,6 were determined in regard to the furrows). The relation between each eld and the characteristics at the respective fields are recognized. *Subject Headings:* **1. Rice addy microclimatology 2. Japan.**—*Author's abstract.*

CLIMATIC CLASSIFICATION

See also: **Evaporation determination for arid districts, U.S.S.R.** (Zubenok), 8.3–241; **Climatic maps, Nile Basin and vicinity** (Hefny), 8.3–257; **Western Siberia and Northern Kazakhstan, geographical appraisal** (Jackson), 8.3–248.

8.3–300 551.585:551.586

Galmarini, Alfredo G., **Esbozo de un nuevo sistema de clasificación climática basada n un criterio antropológico: "los climas humanos."** [Outline of a new method of climatic lassification based on the anthropological concept of "human climates."] *Revista Meteorológica del Perú,* Lima, 2(2):11–34, Jan./March **1956. DWB**—The general problem of the ffect of climate on human life and activities is discussed and a climatic classification is proposed vhich would be based entirely on this effect, involving such concepts as stimulating, depressive nd degenerative climates, comfort climates, racial climates, pathological, psychological herapeutic, and physiological climates, etc. It is suggested that such concepts could be lefined in terms of indexes based on climatic values. *Subject Headings:* **1. Climatic classifications 2. Bioclimatology.**—*G.T.*

8.3–301 551.585.

Dickson, B. T. (*Canberra Univ. Coll., Australia*), **Challenge of arid lands.** *Scientif Monthly*, Wash., D. C., 82(2):67–74, Feb. **1956. DLC**—The problems encountered in th development of arid lands are discussed under the following headings: water, soils, plant animals, man and power sources. The section on water contains a discussion on the feasibilit of artificial precipitation for increasing the water resources of arid regions, evidence for climat change in Tunisia and for climatic stability in Palestine during historical time, measuremen of evapotranspiration in semiarid and arid regions with special reference to the technique C. W. THORNTHWAITE, studies of underground water such as that carried out in the Tha Desert area in Pakistan, and the utilization of saline water. The needed areas of soil researc for semiarid and arid regions as outlined by CHARLES E. KELLOG are quoted. The physiolog of desert plants, physiological stress exerted by desert temperatures on man and the use wind and solar energy as power sources are reviewed briefly. *Subject Headings:* **1. Arid zon climatology 2. Arid zone research 3. Water resources 4. Evapotranspiration.**—*I.L.D.*

8.3–302 551.585.5:581.

Giacobbe, Andrea (*Univ. of Florence*), **Les effets écologiques de l'aridité du climat su la végétation Méditerranéenne: héliophilie et configuration morphologique des forêts.** [Ec logical effects of climate aridity on vegetation in the Mediterranean region: heliophilia and th structure of forests.] *UNESCO, Arid Zone Research, No. 5, Plant Ecology: Proceedings of th Montpellier Symposium*, p. 64–67. pub. **1955.** English summary p. 66–67. **DWB**—Summe aridity necessitates an early liquifying of the tissues, quicker production of glucides and henc bright light in the spring. Forest plants become therefore heliphylic in the Mediterranea region. *Subject Headings:* **1. Arid zones 2. Plant ecology 3. Mediterranean Region.**—*A.A*

8.3–303 551.585.5:577.

*Kassas, M. (*Cairo Univ. Egypt and Univ. College, Khartoum, Sudan*), **Rainfall an vegetation belts in arid North-east Africa.** *UNESCO, Arid Zone Research, No. 5, Plan Ecology: Proceedings of the Montpellier Symposium*, p. 49–59, pub. **1955.** 9 tables, 7 ref French summary p. 58–59. **DWB**—Egypt and Sudan are divided into four climatic belts the Mediterranean coast, Cairo district, rainless country and summer rainfall belt. Dat are given for climatic features (rainfall, humidity, temperature and evaporation). Crops ar critically dependent on rainfall. Statistical data are presented for the prevailing vegetatio in each zone. *Subject Headings:* **1. Arid zones 2. Ecological data 3. Egypt 4. Sudan.**—*A.A*

BIOCLIMATOLOGY

See also: **Desert biol.** (Inst. of Biol., London), 8.3–3; **Housing and building in hot climates, bibliog.** (Nat. Res. Council), 8.3–61; **Ambient conditions and plant diseases** (Bazande Segura), 8.3–81; **Human bioclimatology in the tropics** (Buettner), 8.3-88; **Water level variations, Lake Saimaa** (Simojoki), 8.3–158; **Agricultural monograph on Lake Leopold II District** (Robert), 8.3–290; **Agricultural study, Cunene Valley** (Agronomia Angolana, Luanda), 8.3–291; **Climatic classification based on concept of "human climates"** (Galmarini), 8.3–300.

8.3–304 551.586:581.14:519.2

Glenday, A. C. (*Appl. Math. Lab., D.S.I.R., Wellington, N. Z.*), **The mathematica separation of plant and weather effects in field growth studies.** *Australian Journal of Agr cultural Research*, Melbourne, 6(6):813–822, Nov. **1955.** fig., 4 tables, 3 refs. **DWB**—Th only serious limitations of field growth studies are due to the erratic nature of the curve caused by short-term weather variations and the less apparent deviations caused by secula changes. The method of constant-fitting is applied, via a suitable mathematical model an experimental design, to separate growth and weather effects. A detailed account of the analysi is given, using a trial conducted as a test of the technique as an example, and the future pos sibilities of the technique in field growth studies are discussed. *Subject Headings:* **1. Plan climatology 2. Statistical techniques.**—*Author's abstract.*

8.3–305 551.586:595.1

†Grant, William C., Jr. (*Zoology Dept., Dartmouth Coll., Hanover, N.H.*), **Temperature relationships in the megascolecid earthworm *Pheretima hupeiensis*.** *Ecology*, Durham, N. C., 36(3):412–417, July **1955.** 3 figs., 2 tables, 17 refs. **DWB, DLC**—The results of experiments on the temperature preferenda and upper lethal levels of the megascolecid earthworm and of two common species of lumbrecid worms. Acclimatization at different temperatures and rate of acclimatization were also studied. *Subject Headings:* **1. Bioclimatology 2. Earthworms.** —*I.L.D.*

8.3–306 551.586:612.014.4

Brunt, Sir David, **Some aspects of human ecology in hot tropical regions.** (In: Institute of Biology, London, **Biology of deserts.** London, **1954.** p. 213–218. 4 figs., ref.) **DWB**—A diagram developed by the author for classifying climate on the basis of comfort and tolerance is tested by comparison with data of times of day when work of a specified degree of activity, namely office work, becomes impossible. The work areas selected were Kenya, Uganda and Tanganyika, Kenya Highlands and east of Rift, rest of Kenya, Zanzibar and Pemba. The characteristic stations for each of the areas were Kirgun, Nairobi, Nakuru Mombasa, and Shukwani. The agreement of diagrams with observations is indicated. A map of Africa south of 12°N lat. on which are indicated those parts of Africa "which are unsuitable for European settlement (a) throughout the year, (b) for eight months of the year, (c) for four months of the year, or (d) suitable for more than eight months of the year" is presented. *Subject Headings:* **1. Climatic comfort classifications 2. Human ecology 3. Tropics 4. Tropical Africa.**—*I.L.D.*

8.3–307 551.586:613.15

Cadrecha Alvarez, José and Fernandez Castro, Javier, **Numbers and kinds of air-borne, culturable fungus spores in Havana, Cuba.** *Journal of Allergy*, St. Louis, 26(2):150–152, March **1955.** fig., table, 2 refs. **DLC**—The authors summarize data on the spore load of culturable fungus in the air at Havana during the different annual seasons. The occurrence of atmospheric molds, detectable on Sabauraud's agar, is shown on a graph; spores are very abundant from Oct. to Feb. and for a short period as late as May and early April. The time when asthma and rhinitis was most severe coincided with the highest prevalence of fungi producing allergenic symptoms. *Subject Headings:* **1. Air-borne diseases 2. Allergies Asthma 4. Havana, Cuba.**—*I.L.D.*

8.3–308 551.586:615.79

Kérdő, István, **Balneológiai és klimatológiai gyógytényezők együttes hatása.** [The joint influence of balneological and climatological factors.] *Hidrológiai Közlöny*, Budapest, 36(1):39–41, Feb. **1956.** Russian and German summaries p. 41. **DWB**—General discussion of the biological effects of balneological and climatic factors. Environmental effects are always a result of a variety of factors which are in mutual interaction. Temperature, mechanical state and chemical properties of water are modified by atmospheric temperature, radiation, wind, etc., while the atmospheric heat balance, humidity, radioactivity, aerosol content, etc., are modified by mineral and other waters. *Subject Headings:* **1. Bioclimatology 2. Balneology.** —*G.T.*

8.3–309 551.586:615.834 551.508

Veĭnberg, B. P., **Mater'ial k metodike klimatologicheskikh mikros"emok.** [Methods of climatological micro-observations.] *Meteorologicheskiĭ Vestnik*, Leningrad, 38(2):33–40, Feb. **1928.** 5 tables. **DLC**—In view of deficiency of meteorological instruments necessary for the organization of a series of fixed observation points for the study of microclimatic conditions at individual points (in broken terrain) designated for a health resort, and for the purpose of selecting appropriate sites for the construction of new medical buildings, living quarters and the laying out of walkways for the patients—the author organized a fixed meteorological station of the usual type with hourly observation of meteorological elements and a transportable post at Novaia Belukha (Altai Mountain foothills near Bisk) in July–Aug.

1921. With the portable apparatus of this station consisting of 1 psychrometer, a wind va with Robinson cups, a compass and a watch—observers made the round of 52 climat logically interesting points and made 331 observations. By comparing the results of su observations with interpolated values of meteorological elements at the base station for t same time, it was possible to study the influence of orographic conditions and to eliminate t influence of time. The results are discussed. *Subject Headings:* **1. Medical climatolo 2. Health resorts 3. Meteorological instruments 4. Mobile weather stations 5. Nova Belukha, U.S.S.R.**—*A.M.P.*

8.3–310 551.586:6

Prokof'ev, A. A., **Rastenie i klimat.** [Plants and climate.] *Nauka i Zhizn'*, Mosco No. 6:7–10, 16, June **1955.** illus. **DWB.** Transl. by J. Spirhanzl, as **Roslina a podnebi,** *Meteorologické Zprávy*, Prague, 8(5):140–141, **1955. DLC**—A popular paper by a doctor biological science, showing an example of the yield of a series of cultivated plants, as rubb plants, wheat, sunflower, sugar beets, potatoes, etc., the importance of the influence of clima on the size and the quality of harvest, and the importance of growing crops in areas whe climatic and soil conditions are optional for obtaining desired qualities of crops. It is point out that a correct utilization of the dependence of the plants' "climism" on the climate one of the effective methods of increasing crop yield. *Subject Headings:* **1. Plant climat 2. Crop yield 3. Agricultural climatology 4. Translations. I. Spirhanzl, J.**—*A.M.P.*

8.3–311 551.586:632.7:634

DeBach, Paul; Fisher, T. W. and Landi, John (*all, Dept. of Biological Control, Univ. Calif. Citrus Experiment Station, Riverside*), **Some effects of meteorological factors on stages of *Aphytis Lingnanensis*, a parasite of the California red scale.** *Ecology*, Durha N. C., 36(4):743–753, Oct. **1955.** 2 figs., 5 tables, 9 refs. **DLC**—The meteorological facto influencing mortality are low winter temperatures, high summer temperatures and low h midities. The results of field and laboratory studies are presented in tables. The Aphyt pupae mortality index increases during the hot dry months of July, Aug. and Sept. All stag of Aphytes pupae are affected adversely by constant temperatures of 30°F to 50°F. Lo atmospheric humidities influence seriously adults. Temperatures of 90°F increase mortali of adults regardless of humidity. *Subject Headings:* **1. Bioclimatology 2. Citrus mite** —*I.L.D.*

8.3–312 551.586:632.7:634.

†Wellington, W. G., **Weather and climate in forest entomology.** *Meteorological Mon graphs*, Boston, 2(8):11–18, Oct. **1954.** 2 figs., 41 refs. **DWB**—After a brief review of t effect of climate upon insects, the author discusses the effect of weather upon the spruce bu worms and the tent caterpillar and suggests fields for further research. *Subject Heading* **1. Weather effects on insects 2. Forest entomology.**—*I.L.D.*

ENVIRONMENTAL INFLUENCES

See also: **Topographic influences on discontinuity surface, Snake River Plain, Idaho** (Wilkins), 8.3–169; **Condensation nuclei count in Basel and surroundings** (Bider), 8.3–245.

8.3–313 551.588.2:551.

Sporns, Ulrich, **The influence of topography on the surface winds at Rivers, Manitob** *Canada. Meteorological Division, Circular* 2702, Tec. 223; *Local Forecast Study* No. 29, Sep 22, **1955.** 12 p. 5 figs. **DWB**—Local influences on mean surface winds at Rivers Airpo are investigated statistically by 1) comparison with mean surface winds of 9 stations, comparison with mean low level pibal winds, and 3) comparison with mean surface wind neighboring stations taken over a 7-year period (Oct.–Dec.). Mean local surface wind spee are presented in terms of deviation from general conditions. Topography is found to have considerable effect on surface winds at Rivers. *Subject Headings:* **1. Topographic influenc 2. Surface winds 3. Rivers Airport, Manitoba.**—*G.T.*

SYNOPTIC CLIMATOLOGY

See: **Shurin** (Yoshida), 8.3–266.

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Solar research, conclusions and problems** (Waldmeier), 8.3–15; **Committee, report** (AGU), 8.3–46.

8.3–314 551.590.24:551.510.535:551.594.12:550.384

Nagata, Takesi (*Geoph. Inst., Tokyo Univ.*); Nakata, Yoshiaki (*Radio Res. Lab.*); Rikitake, Tsuneji and Yokoyama, Izumi (*both, Earthquake Res. Inst., Tokyo Univ.*), **Effect of the solar eclipse on the lower parts of the ionosphere and the geomagnetic field.** *Japan. Science Council. Ionosphere Research Committee, Report of Ionosphere Research in Japan*, 9(3):121–135, Sept. **1955.** 11 figs., 2 tables, 4 refs., 23 eqs. **DLC, DWB**—The changes in the electron density of the E-layer are examined in relation to the solar eclipse on May 9, 1948. It is found that the electron density decreases over a wide area, the maximum decrease amounting to about one half of the normal value of the electron density which it is supposed would have been observed if there were no eclipse. Having the maximum decrease at the centre of the eclipsed area, a roughly circular pattern of decrease spreads far beyond the boundary of the area of the optical eclipse. The change in the electrical conductivity integrated throughout the layer is also obtained from the above distribution. Under the assumptions that the solar daily variation of the geomagnetic field is caused by a uniform electric current flowing in the E-layer and that the distribution of the electrical conductivity is given as mentioned above, the changes in the distribution of the current as well as that of the magnetic field on the earth's surface are calculated. The agreement between the observed and calculated changes in the magnetic field is satisfactory not only in the magnitude but also in their time variations. So we may say that the changes in the earth's magnetic field at the time of a solar eclipse are caused by the likely modification of the electric current which is responsible for the solar daily variation of the geomagnetic field. *Subject Headings:* **1. Eclipse effects on ionosphere 2. Ionospheric electron density 3. Eclipse effects on geomagnetic field.**—*Authors' abstract.*

8.3–315 551.590.25:621.396.9

McKinley, D. W. R. and McNamara, A. G. (*both, National Research Laboratories, Ottawa*), **Meteoric echoes observed simultaneously by back scatter and forward scatter.** *Canadian Journal of Physics*, Ottawa, 34(7):625–637, July **1956.** 10 figs., table, 9 refs., eqs. **DWB, DLC**—Simultaneous observations of back-scatter and forward-scatter meteoric echoes have been made by means of a high-power 33 Mc/sec pulse transmitter at Ottawa, with identical receiving systems at Ottawa and at Scarboro, 337.8 km distant. Two-way transmissions, employing a low-power transmitter at Scarboro, were also used to measure absolute time delays. The approximate position of each meteor was plotted from the observed time delays, which enabled corrections to be applied to the echo durations for variations in antenna patterns and other factors, and which also determined the forward-scatter angle, 2ϕ, for each meteor. In the majority of cases an enhancement was observed in the forward-scatter duration relative to the back-scatter duration. The data were divided into a short-duration or underdense group and a long-duration or overdense group. Assuming a theoretical forward-scatter enhancement proportional to $\sec^m\phi$, it was found that the exponent, m, was 1.73 for the underdense group and 1.13 for the overdense group. *Subject Headings:* **1. Meteor echoes 2. Radio wave propagation.**—*Authors' abstract.*

8.3–316 551.590.25:621.396.9

Millman, Peter M. and McKinley, D. W. R., **Meteor echo durations and visual magnitudes.** *Canadian Journal of Physics*, Ottawa, 34(1):50–61, Jan. **1956.** 4 figs., 7 tables, 11 refs., 7 eqs. **DWB, DLC**—The statistical relation between the radio echo duration and the visual magnitude has been investigated for approximately 3300 meteors observed on the

combined Dominion Observatory-National Research Council program at Ottawa. Both echo durations and visual magnitudes were reduced to absolute values, defined as those for a meteor in the zenith at a height of 100 km. For meteors in the absolute magnitude range +5 to −5 a straight line relation exists between log absolute duration and absolute magnitude, longer durations corresponding to brighter meteors. Applying current meteor theory to these data indicates that a meteor of absolute magnitude +5 produces 2×10^{12} electrons per cm of path length. For Perseid meteors the ratio between ionization produced and visual luminosity is almost constant in the range +5 to −5 absolute magnitude. For other meteors this ratio seems to decrease somewhat for the brighter objects. These results lead to higher electron densities for the bright meteors than had previously been estimated. *Subejct Heading:* **1. Radio meteor echo duration.**—*Authors' abstract.*

8.3–317 551.590.25 523.5

Thomas, R. N. (*Harvard College Obs.*), **Heat transfer and the ablation process in meteors.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 1–7. 7 refs., 8 eqs.) **DWB**—A summary is given of conclusions and essential details of attempts to collate data from meteor observations and laboratory investigations on artificial meteors, in order to investigate heat transfer and ablation in the astroballistic regime. Problems stressed are: the necessity to effect a separation of heat transfer and ablation investigations; a decision on the particular ablation process; a decision on the degree to which the continuum or discrete-particle approach may be used. Recent work on meteor pitting and on an improved prediction of the early stages of meteor light-curves are reviewed from the standpoint of their contribution toward clarifying the above problems. *Subject Headings:* **1. Meteor ablation 2. Meteor trails.**—*Author's abstract.*

VISIBILITY

See also: **Visibility of earth satellite** (Tousey), 8.3–73; **Visibility deterioration, jet aircraft** (Clodman), 8.3–76.

8.3–318 551.591.6:551.578.4

Murden, W. D., **An investigation of vertical and slant visibility in snow.** *Canada. Meteorological Div., Cir.* 2686, Tec. 220; *Local Forecast Study,* No. 28, July 26, **1955.** 4 p. 3 figs., 3 tables, ref. **DWB**—The relationship between vertical visibility in snow as measured by means of ceiling projector and ceiling balloons and the horizontal visibility as measured by a ground observer is obtained from Fort William aviation weather reports. They are in substantial agreement with previously established relationships for Moncton airport. *Subject Headings:* **1. Vertical visibility 2. Slant visibility 3. Visibility in snow 4. Canada.**—*Author's abstract.*

OPTICAL PHENOMENA

See also: **Transmission of ultra-violet sunlight** (Deirmendjian), 8.3–174.

8.3–319 551.593.1

Zwicky, F. (*Mt. Wilson and Palomar Obs., Pasadena, Calif.*), **Aerial blobs.** *Science,* Wash., D. C., 122(3160):159–160, July 22, **1955.** 2 figs., 2 refs. **DCL, DWB**—Some striking features of the stellar scintillations and distortions due to "aerial blobs" (volumes of air of locally altered density, temperature and water content) that possess remarkable optical properties, are described and discussed. In combination with the mirrors of lenses of a telescope, blobs often displace bodily the images of stars or focus them in points in front or behind the regular focal surface. Linear dimensions of aerial blobs range from millimeters to many meters and may be globular, lenticular or cylindrical in shape thus producing point-like or linelike star images. Often hundreds of blobs are quite regularly spaced and drift with the wind at various altitudes up to 50 km or more. Semi-periodically distributed globular and stratified cirrus clouds may be intrinsically of the same nature as aerial blobs. Some simple optical tests described in the paper and the study of extrafocal images of bright stars and analyses of drifted spectra promise to produce information on the important disturbances in the earth's atmosphere. *Subject Headings:* **1. Scintillation 2. "Aerial blobs."**—*A.M.P.*

8.3–320 551.593.5:551.576

Volz, Fr., **Ein Bishopring am Dunsthimmel.** [A Bishop ring in a hazy sky.] *Zeitschrift für Meteorologie*, Berlin, 8(11/12):383, Nov./Dec. **1954.** 2 refs. **DWB**—The Bishop ring was observed in Mainz on July 19, 1954. It occurred at 14:30 following noon rain and consisted of a bluish white disc, 25° wide, around the sun. This observation indicates that in the case of extensive cloudiness associated with moderate rainfall the size distribution of the aerosol is such that after dissolution of the clouds, haze particles with a radius of about 0.25μ exert an optical effect greater than normal and thus produce a Bishop's ring. *Subject Headings:* **1. Bishop's ring 2. Cloud effects on optical phenomena.**—*I.L.D.*

8.3–321 551.593.53:551.521.3

Volz, Fr., **Himmelslicht und atmosphärische Trübung.** [Sky light and atmospheric turbidity.] *Wetter und Leben*, Vienna, 6(5/6):99–104, Aug. **1954.** 2 figs., table, 10 refs. **DLC**—After a brief review of some studies on atmospheric turbidity and the principles of the optics of haze the author presents an analysis of measurements and observations on haze scattered light carried out at Arosa, Frankfurt and Mainz. Three types of turbidity are described: Bishop ring—turbidity type C, B and A. The brightness distribution of the various types, the characteristic particle size distribution and the associated meteorological characteristics, such as cloud, air masses, etc. are discussed. *Subject Headings:* **1. Turbidity 2. Sky brightness 3. Haze 4. Germany.**—*I.L.D.*

8.3–322 551.593.651:551.576

Middleton, W. E. Knowles (*Natl. Res. Council of Canada, Ottawa*), **The color of the overcast sky.** *Optical Society of America, Journal*, 44(10):793–798, Oct. **1954.** 5 figs., 3 tables, 24 refs., 15 eqs. **DLC**—A theory is developed for the spectral irradiance of the top of the overcast, in terms of incident radiation, droplet size and concentration, and cloud thickness. The absorption of light by cloud water is allowed for. Some samples of highly polluted cloud water have been spectrophotometered, and calculations made which show that the absorption produces very little effect in the visible spectrum, and only a moderate effect in the ultraviolet, even for the very impure cloud water. On the other hand, the color of the ground has a considerable effect on the spectral irradiance of the overcast sky, and thus on its color. The color of the top of the overcast is, however, not greatly affected by that of the ground. *Subject Heading:* **1. Cloud coloration.**—*Author's abstract.*

ELECTRICAL PHENOMENA

See also: **Ultra-short wave distant reception . . .** (Klinker), 8.3–20; **Aurora Australis, observation** (Parsons, Fenton), 8.3–23; **Sferics reception at high frequencies** (Horner), 8.3–96; **Balloon launchings . . .** , 8.3–106; **Sq current system in ionospheric radio sounding** (Appleton), 8.3–146; **Distortion of E layer by electrical currents** (Appleton), 8.3–147; **Evaporation in electric field** (Miura), 8.3–239; **Condensation nuclei in meteorological-electrical relations** (Israël), 8.3–251; **Thunderstorm and nitrogen in rain** (Mukherjee), 8.3–261; **Chemical constituent of atmos. precipitation** (Voronkov), 8.3–262; **Eclipse effects on ionosphere and geomagnetic field** (Nagata et al.), 8.3–314.

8.3–323 551.594.1

Holzer, R. E. and Ruttenberg, P. L., **Summary of atmospheric electrical data at selected land and sea stations, 1954.** California. Univ. at L. A., Institute of Geophysics, Contract AF 19(122)-254, Scientific Report, No. 10, May 31, **1955.** 177 p. figs., numerous tables. **DWB**—Numerical data from measurements of electric potential gradient, conductivity, and air-earth current density at selected sites in California, the Pacific Ocean, Hawaii, and Australia for the year 1954 are presented. Tables of hourly mean values are introduced by notes indicating the experimental and evaluation procedures, and explaining the terminology used. Graphs of the mean diurnal variation of the several variables are shown for purposes of visual comparison. Other pertinent information, including indices of field test sites and dates, is presented in an appendix. *Subject Headings:* **1. Atmospheric electricity data 2. Diurnal atmospheric electricity variations.**—*Authors' abstract.*

8.3–324 551.594.11

Holzer, R. E., **Studies of the universal aspect of atmospheric electricity.** California. Univ. at L. A., Institute of Geophysics, Contract No. AF 19(122)-254, Final Report, June 30, **1955.** 76 p. 23 figs., 16 refs., eqs. **DWB**—Observations of the atmospheric electrical potential gradient, conductivity and air-earth current density were made in California, Hawaii and over the Pacific Ocean at 0 to 4300 m above sea level in order to determine world wide changes in the earth's electrical field. Mountain stations proved to be the most reliable (least disturbed), especially at night. In the daytime anomalies develop, even at mountain stations. Turbulence at surface, and convection currents account for these disturbances, which when taken into consideration make mountain observations as good as those over the sea for estimating world-wide diurnal variation in geoelectric field. Simultaneous observations made in July and Aug. 1953 and 1954 on Palomar and White Mountain, California, and Haleakala, Hawaii, and ocean observations made from March 1952–Dec. 1954, agree with data obtained on the "Carnegie," indicating no appreciable trend in mean seasonal diurnal variation. Relation to world-wide thunderstorm activity and local centers indicates that an index of world thunderstorm activity can be obtained from such records as were obtained in this investigation. General theory of C. T. R. Wilson is supported, and a relaxation time of 10 minutes postulated for the world electric system to come to equilibrium. Hence potential gradient over sea (downward) should equal upward thunderstorm flux. *Subject Headings:* **1. Atmospheric potential gradient measurements 2. Earth's electric field 3. World-wide thunderstorm activity.**—*M.R.*

8.3–325 551.594.12:537.57

Bailey, V. A., **Dynamics of an ionized medium with applications to systems of ions and electrons in steady motion, Part 1.** Pennsylvania. State Univ. Ionosphere Research Laboratory, Contract AF 19(122)-44, Scientific Report, No. 62, May 15, **1954.** 77 p. 3 figs., refs., numerous eqs. **DWB**—Paper discusses theory beginning with fundamental equations for a monoionic fluid at zero temperatures, and going on to discuss the auxiliary 4-vector pi, the field equations in terms of vectors and scalars, the steady state study rectilinear, steady curvilinear and steady axial motion. Finally, special cylindrical and special conical models are set up. *Subject Headings:* **1. Ionized media dynamics 2. Ion mobility theory.**—*M.R.*

8.3–326 551.574.1:551.594.12

Breĭdo, Ts. G., **Issledovanie mekhanizma adsorptsii ionov kapliami vody.** [Investigation on the mechanics of adsorption of ions by water drops.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 6:521–528, Nov./Dec. **1955.** 8 figs., 4 tables, 5 refs., eq. **DLC**—The author presents the results of an experimental study of the dependence of the charge acquired by drops falling through a current of ionized air, upon the concentration and coefficient of diffusion of both positive and negative ions in the atmosphere, the velocity of movement of drops and on the radius of the drops. On the basis of the results obtained it is concluded that in weak electric fields the diffusion of ions is the principal mechanism involved in the charging of drops. The experimental procedure including a diagram of the apparatus for measuring the concentration of ions, drop size, air velocity, etc., tables giving the measurements and graphs and equations showing the interdependence of the variables are presented. *Subject Headings:* **1. Drop charge 2. Ionization of drops.**—*I.L.D.*

8.3–327 551.594.12:523.57

Evans, S. and Hall, J. E. (*both, Jodrell Bank Experimental Station, Univ. of Manchester*), **Meteor ionizing and luminous efficiencies.** (In: Kaiser, T. R. (ed.), **Meteors.** London, Pergamon Press, **1955.** p. 18–22. 2 figs., 2 tables, 12 refs., 6 eqs.) **DWB**—Simultaneous radio and visual observations of meteors made at Jodrell Bank have been used to estimate the ratio of luminous to ionizing efficiency in the meteor evaporation process. A comparison of the results obtained from observations made during the Perseid and Geminid showers shows this ratio to vary little with meteor velocity. The ionizing efficiency is related to the probability of ionization of a single evaporated meteor atom. Evidence is presented which suggests that this probability may approach unity and that it has only a small velocity dependence. *Subject Headings:* **1. Meteor ionization 2. Meteor luminosity.**—*Authors' abstract.*

8.3–328 551.594.12:541.13

†Ghosh, S. N.; Sheridan, W. F.; Dillon, J. A., Jr. and Edwards, H. D., **A review of charge transfer processes in gases.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 48, July **1955.** 17 p. 10 figs., 3 tables, 48 refs., 6 eqs. **DLC**—A review is given of the nature and importance of the charge transfer process ($A^+ + B \rightarrow A + B^+$) particularly with regard to its role in certain chemical and physical processes. Experimental techniques for determining the charge transfer cross sections are discussed, with special reference to the recent method whereby the number of ions due to charge transfer is directly compared with that of the primary beam. This technique has been utilized by the authors. The cross sections obtained from experimental data in the energy range 50–800 eV are discussed in some detail. The data obtained by other investigators from thermal energies to 40 KeV are also presented. It is shown that the adiabatic theory (Massey) satisfactorily explains the charge transfer reaction for a large number of simple atomic and molecular cases. However, certain very simple cases cannot be explained in terms of this theory even by assuming excited states or dissociation of the molecules by collision. *Subject Headings:* **1. Electrochemistry 2. Ion transfer.**—*Authors' abstract.*

8.3–329 551.594.13:551.584.61

Belon, A. E., **Experiments on the variation of conductivity of air within sealed rooms.** California. Univ. at L. A., Institute of Geophysics, Contract AF 19(122)-254, Scientific Report, No. 11, June 30, **1955.** 23 p. 7 figs. (incl. photo), table, 7 refs., 9 eqs. **DWB**—The variation of electrical conductivity of air inside sealed rooms has been investigated under several experimental conditions. This variation is attributed to a decrease in the concentration of nuclei Z. When Z is computed from the conductivity according to Schweidler's theory of ion-equilibrium it is found that our data are well represented by Nolan's relation $dZ/dt = -\gamma Z^2 - \sigma Z$, where γ and σ are, respectively, the coagulation and sedimentation coefficients. These coefficients are found to depend strongly upon the degree of air turbulence. *Subject Headings:* **1. Electrical conductivity of the air 2. Indoor air.**—*Author's abstract.*

8.3–330 551.594.13:551.515

Kikuchi, Shigeo, **The continuous registrations of the atmospheric small-ion contents at Kakioka and some relations to the meteorological elements.** *Kakioka, Japan. Magnetic Observatory. Memoirs*, 7(1):55–74, May **1954.** 13 figs., 7 tables, 28 refs., 6 eqs. In Japanese; English summary p. 55. **DWB**—Since 1951, continuous registrations of the atmospheric small ions have been carried out using an Ebert-type ion counter and a Denshi-type long recorder. The writer explains the theory and the construction of the recorder, whereby the leakage curves and calibrations of measuring system are automatically recorded every four hours. Variations of small ions on both calm and disturbed days are described with respect to the observed data for the period 1951 to 1952. 1. On calm days, the annual mean values of small ion densities are 408 and 360 per unit volume of the air for positive and negative ions, respectively. The annual mean diurnal variation of small ion densities shows the double maximum-type with two considerable sharp minima at early morning and evening, as generally observed at land stations. The seasonal changes of diurnal variation are indistinct. 2. The disturbances are frequently subsequent to ordinary rainfalls, snowfalls, thunderstorms, fogs, hazes, dust-storms, etc. *Subject Headings:* **1. Atmospheric ions 2. Ion counters 3. Ion density 4. Atmospheric disturbances 5. Kakioka, Japan.**—*Author's abstract.*

8.3–331 551.594.14:551.506.7:551.551

Wilkening, Marvin H., **Variation of natural radioactivity in the atmosphere with altitude.** *American Geophysical Union, Transactions*, 37(2):177–180, April **1956.** fig., table, 7 refs., eqs. **DWB, DLC**—The vertical distribution of radon decay products in the lower atmosphere has been measured during airplane flights, using both negative-wire and precipitator methods of sample collection. Data taken by the wire method show a very gradual decrease in activity with height, with considerable activity found to exist at 16,000 ft (msl). The precipitator results indicate an approximately linear decrease with altitude, with no appreciable activity found in samples collected by this method above about 11,000 ft. Measurements made at

four ground stations in the altitude interval 4620 to 10,297 ft gave similar results. The mean value for the coefficient of eddy diffusion in the atmosphere calculated from the precipitator data were 7 ± 4 m²/sec for the plane flights and 11 ± 7 m²/sec for the ground stations. *Subject Headings:* **1. Radioactivity in the atmosphere 2. Airplane observations 3. Eddy diffusion.**—*Author's abstract.*

AURORAS

8.3–332 550.385 551.594.5

Alfvén, Hannes (*Royal Inst. of Tech., Stockholm*), **Magnetic storms and aurorae.** *Maryland. Univ. Institute for Fluid Dynamics and Applied Mathematics, Lecture Series,* No. 31, Feb. **1954.** 38 p. 11 figs., 8 tables, numerous eqs. **DWB**—A systematic discussion of the origin of the earth's magnetic field, its characteristics, variations (secular, quiet day, magnetic storm, and other types), morphology of magnetic storms, the aurora, theories of magnetic storms and the aurora, the electric field theory, terrella experiments, motions of charged particles in a dipole field under the influence of an electric field, currents produced by the trochoidal motion of charged particles, the current system, the development of a magnetic storm, deformation of the front, surface, current across the y-z plane, production of a space charge and currents along the lines of force. Models and samples of records are appended. The circular ring current of CHAPMAN is assumed to be impossible but a trochoidal path probable. *Subject Headings:* **1. Magnetic storms and auroras 2. Ring current theory.**—*M.R.*

8.3–333 551.594.5

Beiser, Arthur, **On the origin of auroral forms.** *Journal of Geophysical Research,* 58(2): 275–276, June **1953.** fig., ref. **DWB**—In a short note the author shows that the form of the aurora (arcs, rays, draperies, beams, etc.) could depend entirely on the zenith angle of ζ of the incident beam of particles which strike the upper atmosphere. The more nearly vertical the beam the less it will be deflected by the magnetic field and the deeper it will penetrate, whereas at $\zeta\sim\pi/2$ the stream may be deflected into a spiral orbit. The variation of luminosity L with height h, is: $L=L'\exp(1-z-e^{-z})$, where L' is maximum luminosity and $z=(h-h')/H$. Where $H(=kT/Mg)$ is the scale of length. The relation of the relative intensity L/L' with z is shown graphically for 3 zenith angles and the 3 curves agree with experimental curves for 1) arcs, 2) draperies, and 3) rays. *Subject Headings:* **1. Auroral forms 2. Zenith angle of incident beam.**—*M.R.*

8.3–334 551.594.5

Castillo, Paulo, **Aurora polaris.** *Philippines. Weather Bureau, The Elements,* 3(7):5–8, July **1952.** 8 refs. **DWB**—This article, which was written in connection with an MIT contest on scientific subjects for popular reading, sums up current knowledge on auroras. The corpuscular and ultraviolet auroral theories, the height, distribution, occurrence and main forms of auroras are discussed. A description of thirteen types of auroras is added. *Subject Heading:* **1. Auroras.**—*G.T.*

8.3–335 551.594.5:523.78

Chapman, Sydney and Stibbs, D. W. N. (*fellow, Univ. Observatory, Oxford*), **Solar eclipses and the aurora borealis.** *Alaska. University. Geophysical Institute, Contributions, Ser. B,* No. 4, **1953.** 4 figs., photos. **DWB.** Reprint from *Sky and Telescope,* N. Y., 13(2):35–39, Dec. **1953.**—In connection with plans for an observational program during and along the path of total eclipse of the sun on June 30, 1954, the authors suggest the excellent and rare opportunity which will be afforded, to determine whether or not auroras occur in midday (it is known that they occur in twilight). Also the intensity, color, and other special characteristics of the aurora can be observed if there happen to be a good display in the region of the maximum auroral frequency which is crossed for a period of several hours and a distance of 1000 miles (over North Atlantic near Greenland) by the path of totality. Chances of an aurora occurring are evaluated, and the contrast between sky brightness in total eclipse and auroral brightness and character of daytime compared to night auroras are discussed. *Subject Headings:* **1. Auroral observations during eclipses 2. Solar eclipse, June 1954.**—*M.R.*

8.3–336 551.594.5:771

Herman, Louis and Leinbach, Harold, **Photographic study of the green and infra-red emissions of the polar aurora.** *Alaskan Science Conference, 2nd, Mt. McKinley National Park, Sept.* 4–8, 1951, *Proceedings*, p. 287, pub. [1953?]. **DWB**—Fast infrared film was used with a red filter in one camera and super X film with a green filter in another camera, to take simultaneous pairs of pictures of the aurora at 2 min intervals with one minute exposure. Over 200 pairs were taken, some of which showed enhancements of infrared emission over the green, the greatest enhancement being by a factor of 4. It is thought that the first positive system of nitrogen was responsible for the infrared enhancement for low altitude aurorae. *Subject Headings:* **1. Auroral photography 2. Infrared auroral emissions.**—*M.R.*

8.3–337 501.594.5:551.508.94

Hunten, D. M. (*Univ. of Saskatchewan, Saskatoon, Canada*), **Automatic auroral recorder.** *Optical Society of America, Journal*, 46(8):578–583, Aug. **1956.** 8 figs., 7 foot-refs. **DWB, DLC**—A description is given of a device which automatically sweeps the meridian once each five minutes and records the intensity of the auroral green line (5577 Å) in each 10° step. It is almost completely insensitive to white light, but produces a warning signal if the white light becomes very bright. The response is roughly logarithmic over a range of 10,000 to 1 in intensity. The intensities are recorded directly and also in digital form. For the latter, five steps of intensity are distinguished and punched in paper tape; each step corresponds to a factor of 10 and the scale agrees fairly closely with the accepted International Brightness Coefficients. *Subject Heading:* **1. Auroral recorders.**—*Author's abstract.*

8.3–338 551.594.51:550.38

Ferraro, V. C. A. (*Queen Mary College, Univ. of London*), **Origin of magnetic storms and aurorae.** *Annales de Géophysique*, Paris, 11(3):284–304, July/Sept. **1955.** 11 figs., table, 19 refs., 12 eqs. **DLC**—This paper gives a full, well-illustrated account of the Chapman-Ferraro theory of magnetic storms and aurorae. After reviewing briefly the reasons in favor of a solar corpuscular theory, and the average characteristics of magnetic storms derived from the analyses of CHAPMAN and MOOS, the nature of such streams is discussed at some length, with special reference to its composition, geometry, and dimensions. The solar stream seems likely to consist mainly of protons and electrons and to advance in to the earth's field with a speed of the order of 10^8 cm/sec. It is shown that during this advance, surface currents are induced in the stream surface and that these shield the back of the stream from the geomagnetic field. MARTYN's extension of the theory to polar disturbances and auroras is briefly reviewed. The chief feature of this is the recognition that a high potential difference exists across the ring enabling escaping charges from the unstable surface layers to be accelerated to speeds well above the streaming velocity of 10^8 cm/sec. and be precipit ated along the aurora zones. This accords well with the fact discovered by MEINEL that the speed of protons entering the atmosphere during auroral displays may well be about 10^9 cm/sec. ALFVÉN's theory is also briefly discussed. *Subject Headings:* **1. Magnetic storms 2. Chapman-Ferraro theory 3. Auroral theories.**—*From author's abstract.*

8.3–339 551.594.51:550.38

Fleischman, O. and Lippmann, B. A., **Remarks on Alfvén's perturbation method.** N. Y. Univ. Inst. of Mathematical Sciences, Div. of Electromagnetic Research, Contract AF 19(604)-926, Research Report MH-4, August **1955.** 11 p. ref., num. eqs.—ALFVÉN's perturbation method for treating the motion of a point charge in a magnetic field consists of three elements: 1) The field is regarded, in zero order, as homogeneous. In the next order, the zero-order motion is replaced by its averaged effect, a magnetic dipole, and the interaction of this "equivalent dipole" with the inhomogeneities of the field constitutes the perturbation. 2) The moment of the "equivalent dipole" is constant. 3) if the field is axially symmetric, the "equivalent dipole" moves on the surface generated by rotating a line of force about the polar axis. ALFVÉN develops his method by the analysis of several special cases. In this report, we have re-derived his perturbation scheme from a viewpoint that emphasizes general dynamical principles. Thus: 1) is derived directly from HAMILTON's principle, 2) is proved by the adiabatic theorem, after noting that the moment of the "equivalent dipole" is an action

variable, while 3) is related to the conservation of angular momentum. Our remarks under 2) and 3) are intended as an extension of ALFVÉN's discussion. *Subject —eadings:* **1. Auroral particles 2. Magnetic effects.**—*Authors' abstract*

8.3–340 551.594.51

†Seaton, M. J. (*Univ. College, London*), **Excitation processes in the aurora and airglow, Pt. 1, Absolute intensities, relative ultra-violet intensities and electron densities in high latitude aurorae.** *Journal of Atmospheric and Terrestrial Physics*, London, 4(6):285–294, **1954.** 2 figs., 3 tables, refs., p. 293–294, 4 eqs. Also: **Pt. 2, Excitation of forbidden atomic lines in high latitude aurorae.** *Ibid.*, p. 295–313. fig., 9 tables, 32 eqs. **DWB**—Pt. 1 discusses certain auroral observations and seeks to obtain information in a form which is best suited to the study of physical processes. An attempt is made to express largely descriptive information on the auroral brightness in terms of a quantity $\pi(5577)$, the number of oxygen green line quanta emitted, in the line of sight, per cm^2 column per second. It is concluded that International Brightness Coefficients I, II, III and IV correspond to $\pi(5577)$ being approximately equal to 2.10^9, 1.10^{10}, 1.10^{11} and 5.10^{12} cm^{-2} sec^{-1}. An extreme upper limit is estimated as 5.10^{15} cm^{-2} sec^{-1}. Measured auroral intensities in ultra-violet vibration bands are compared with intensities obtained from theoretical and laboratory studies. By considering various v'' progressions (fixed upper state) it is shown that the auroral intensities are in error by an amount which increases systematically as the wavelength is decreased. An empirical correction curve is obtained. Radio and optical evidence on the electron density is discussed and it is concluded that electron densities between 10^7 and 10^8 cm^{-3} occur in bright high latitude aurorae. In Pt. 2, a summary is given of the various excitation and deactivation processes which may occur, and an attempt is made to decide which of these will be of major importance. Relative intensities of the [OI] lines (λ5577, and 6300+6364) show that deactivation must occur. If electron deactivation alone occurs, $n(e)$ must be $\geqslant 7.10^7/cm^3$ at the lower border and $\geqslant 2.10^7/cm^3$ at the upper border. It was concluded in pt. 1 that such values are possible for a bright display. Various deactivation processes involving collisions with gas molecules are discussed. Although none of these appear to be particularly promising, there are several processes which may contribute. At and above the level of maximum luminosity it is considered that the [OI] lines are excited by electron impact. Below this level there is some evidence that an additional excitation mechanism becomes important. This is probably $O_2^+ + e \rightarrow O' + O''$. Electron deactivation can account for the relative intensities of the NI lines (λ3467 and 5199) with electron densities similar to those required for the [OI] lines. An improbably high degree of nitrogen dissociation would be required if electron impact on atomic nitrogen was assumed to be responsible for excitation of the [NI] lines. The forbidden line emission rate resulting from $N_2^+ + e \rightarrow N' + N''$ is estimated and found to be in good agreement with observation. Proposed identifications with [NII], [OII] and [OIII] lines are discussed. The only one for which the identification does not appear to be in doubt, [NII] λ5755, is probably excited by dissociative ionization of N_2, $N_2 + X \rightarrow N' + N^{+\prime\prime} + e + X$. *Subject Headings:* **1. Auroral excitation mechanism 2. Auroral intensities 3. Auroral spectra.** —*Author's abstract.*

SFERICS AND RADIO METEOROLOGY

8.3–341 551.594.6:621.396.812

Srivastava, C. M., **The propagation of a radio atmospheric.** *Institution of Electrical Engineers, London, Proceedings, Pt. B*, 103(10):542–546, July **1956.** 4 figs., 2 tables, 9 refs., 12 eqs. **DLC**—The smooth oscillatory type of atmospheric is interpreted on the basis of optical properties of wave guides. The pulse is considered to originate from a pilot streamer and to be rectangular with a duration of 100 microsec. The propagation path is the space between the earth and ionosphere, taken as parallel planes. The wave form characteristics are calculated and agree with observation. *Subject Headings:* **1. Sferics propagation 2. Sferics wave forms.**—*C.E.P.B.*

8.3–342 537.228:621.396.029.6:551.594.7

Autler, S. H. and Townes, C. H. (*both, Columbia Univ., N. Y.*), **Stark effect in rapidly varying fields.** *Physical Review*, N. Y., 100(2):703–722, Oct. **1955.** 5 figs., 14 refs., numerous

eqs. **DLC**—A method is developed for calculating the effects of a strong oscillating field on two states of a quantum-mechanical system which are connected by a matrix element of the field. Explicit approximate solutions are obtained for a variety of special cases, and the results of numerical computations are given for others. The effect of an rf field on the $J=2\rightarrow1$ l type doublet microwave absorption lines of OCS has been studied in particular both experimentally and theoretically. Each line was observed to split into two components when the frequency of the rf field was near 12.78 Mc or 38.28 Mc, which are the frequencies separating the $J=1$ and $J=2$ pairs of levels, respectively. By measuring the rf frequency, v_0, at which the microwave lines are split into two equally intense components, one may determine the separation between the energy levels. The measured value of v_0 depends upon the intensity of the rf field and the form of this dependence has been calculated and found to be in good agreement with the experimental results. *Subject Headings:* **1. Stark effect 2. Microwave propagation.**—*Authors' abstract.*

8.3–343 551.594.7:621.396.11

†Carroll, T. J. and Ring, R. M. (*both, MIT, Lincoln Lab., Lexington, Mass.*), **Propagation of short radio waves in normally stratified troposphere.** *Institute of Radio Engineers, N. Y., Proceedings,* 43(10):1384–1390, Oct. **1955.** 3 figs., 24 refs., eqs. **DLC**—Experiments of the past decade give stronger fields well beyond the horizon than are calculated by the 4/3 airless earth approximation. Post-war work on the theory of the WKB approximation for wave propagation in slowly varying inhomogeneous media, and the peculiar results for eigenvalues of the bilinear refractive index profile offer valuable clues in the search for an oversight in conventional propagation theory. If the absolute value as well as the gradient of the refractive index at the earth's surface be specified, with a refractive index profile which tapers to vacuum at some arbitrarily large height, then allowed modes of the wave equation permit the field to be calculated within, just beyond, and well beyond the horizon, in agreement with many vhf and microwave experiments. Modes thus calculated are supported by ordinary coherent molecular scattering in normal air dielectric layer. At times, superrefraction and macroscopic turbulence are additional mechanisms for propagation deep into the shadow of the earth bulge. *Subject Headings:* **1. Short wave radio propagation 2. Refractive index.**—*Authors' abstract.*

8.3–344 551.594.7:551.521.7:629.396.8

Cohen, M. H., **Interpretation of radio polarization data in terms of Faraday rotation.** Cornell Univ. School of Electrical Engineering, Contract AF 19(604)-73, Research Report EE 295, May 30, **1956.** 20 p. 3 figs., 10 refs., 27 eqs.—A simple graphical presentation of HATANAKA's theory of Faraday dispersion due to a finite receiver bandwidth is made. Two-frequency and two-bandwidth experiments to measure dispersion are considered, and the analysis of a two-bandwidth experiment is discussed in detail. The validity of the high frequency approximation is established for the solar corona, even for the region just above the plasma level, as long as $y\ll1$, and $z\approx0$. BUDDEN's criterion for independence of magneto-ionic modes is applied to two corona models. Using the Allen-Baumbach formula for electron density and a polar field of one gauss, the dipole magnetic field model yields uncoupled modes all the way from the plasma level to the limiting region at the bottom of the earth's ionosphere. With an irregular dipole field the modes are uncoupled if the gradient of magnetic field is very much less than a limit which is proportional to wavelength, and depends on the height above the photosphere. At $(r/r_0)=2$ and $\lambda=1$ meter, for example, it is 1 gauss in 25 kilometers. *Subject Headings:* **1. Radiowave polarization 2. Solar radio radiation 3. Faraday rotation.**—*Author's abstract.*

8.3–345 551.594.7:621.396.029.6

†Crain, C. M. (*Electrical Engrg. Res. Lab., Univ. of Texas*), **Survey of airborne microwave refractometer measurements.** *Institute of Radio Engineers, N. Y., Proceedings,* 43(10):1405–1411, Oct. **1955.** 12 figs., 13 refs. **DLC**—This paper presents a summary of airborne refractive index measurements which have been made at many locations in the United States both over land and off the east and west coasts, by several organizations. Included are the results of studies of the mean vertical structure of the index of refraction of the atmosphere as a function of such factors as location, season, horizontal distance, and time. Included also

are the results of measurements of the fine detail variations of refractive index about its mea value at several locations for altitudes up to 20,000 feet mean sea level. *Subject Heading* **1. Microwave refraction 2. Refractive index.**—*Author's abstract.*

8.3–346 551.594.7:061.6(0

Japan. Radio Research Laboratories, Tokyo, **Seventh Semi-Annual Meeting on R searches Conducted in the Laboratories.** Its *Journal*, 2(7):107–109, Jan. **1955.** Listing papers presented [with English titles]. **DWB**—Lists 16 papers read on Oct. 26, and 33 Oct. 27, 1954 on many aspects of ionospheric and tropospheric propagation. Meeting w held at the Hall of the Radio Research Laboratories, Tokyo. *Subject Headings:* **1. Radiowa propagation 2. Meteorological research 3. Symposia.**—*M.R.*

8.3–347 551.594.7:551.577:621.396.029

Johnson, John C., **Scattering from a dielectric prolate spheroid.** Tufts College. Dept. Physics. Research Lab. of Physical Electronics, Contract AF 19(604)-550, Scientific Repo No. 3, Feb. 15, **1955.** 101 p. 11 refs., numerous eqs.—Solutions of the electromagnet wave equation in prolate spheroidal coordinates are investigated to determine if functio similar to those used by MIE can be constructed. Approximate solutions are found that a useful for both low and high eccentricities of the ϵ coordinate. Using these approxima solutions, the scattering of a plane electromagnetic wave incident along the major axis of prolate spheroidal scatterer is investigated. A numerical example of back scattering of t 3.2 cm microwave by a prolate spheroidal ice pellet is presented. *Subject Headings:* **1. Rad echoes from precipitation 2. Microwave scattering.**—*Author's abstract.*

8.3–348 551.594.7:621.396

To study whistlers. *Science News Letter*, Wash., D. C., 67(1):3, Jan. 7, **1956. DW DLC**—Whistlers, which are radio waves of audiofrequency that are born of individual lightni impulses, will receive special attention during the International Geophysical Year, 1957–195 Whistlers are not the same as cosmic noise due to radio waves from outer space. The so-call "dawn chorus," a radio effect connected with the aurora and magnetic disturbances and caus by the bombardment of the earth by material shot from the sun, will be also listened to. is hoped that this will settle what comes from the sun to disturb radio, TV and wire communic tions on the earth, particularly at the time of the greatest prevalence of sunspots. *Subj Headings:* **1. Whistlers 2. Radio noise 3. Radio wave propagation disturbances.**—*A.M.P.*

8.3–349 551.594.7:551.510.

Trolese, L. G. (*Smythe Res. Associates, S. Diego, Calif.*), **Characteristics of troposphe scattered fields.** *Institute of Radio Engineers, N. Y., Proceedings*, 43(10):1300–1305, Oc **1955.** 12 figs., table, 6 refs., eqs. **DLC**—Experimental results obtained with transmissio at wavelengths of 3.2, 9.3, and 24 cms over a 46.3-mile path are presented. With low termin heights the scattered field was dominant on this path. Tests with a narrow beam antenn indicate that the scattered field arrives at the receiver spread over an appreciable angle. Th angle is some five to seven times as large as the Booker-Gordon theory predicts on the a sumption that the scale of turbulence is large compared to the wavelength. Loss in abili to receive power in proportion to antenna gain was encountered for antennas with apertu diameters greater than about 20 wavelengths. This loss occurs for aperture sizes considerab smaller than the Booker-Gordon theory predicts. The speed of fading of the scattered fie signal increases almost linearly with frequency. This agrees fairly well with the concept (d to Ratcliffe and applied to tropospheric scattering by Booker and Gordon) that fading is d to beating between various scattered field components whose frequencies differ by a fraction Doppler shift due to motion of the scatterers. The speed of fading always increases, durin the day, with time of day and does not correlate with mean upper wind speed. This increa with time of day is probably connected with the repetitive diurnal meteorological cycle pre alent in Arizona. *Subject Headings:* **1. Tropospheric scattering 2. Radio wave transmissio 3. Radio fading.**—*Author's abstract.*

8.3–350 551.594.7:537.5

Wait, James R., **Radiation resistance of dipoles in an interface between two dielectrics.** *Canadian Journal of Physics*, Ottawa, 34(1):24–26, Jan. **1956.** fig., 3 refs., 11 eqs. **DWB, DLC**—Exact expressions are derived for the radiation resistance of electric and magnetic dipoles located in the plane interface between two semi-infinite lossless dielectrics. *Subject Heading:* **1. Dipole fields.**—*Author's abstract.*

ACOUSTICAL PHENOMENA

8.3–351 534.2 551.596.5

Thiessen, G. J., **On the efficiency of an acoustic line source with progressive phase shift.** *Canadian Journal of Physics*, Ottawa, 33(11):618–621, Nov. **1955.** 3 figs., 7 refs., 4 eqs. **DWB, DLC**—The introduction of a small continuous phase shift along the length of a finite line source does not result in a decrease of energy radiated but simply causes the directionality pattern to change. When the phase shift is such that it corresponds to the phase shift with distance in a sound wave, then the directionality pattern has changed through 90° and the energy radiated begins to drop rapidly. At this point the slope of the energy vs. phase shift parameter curve increases with increasing frequency. *Subject Headings:* **1. Acoustics . Thunder.**—*Author's abstract.*

PART II. RECENT LITERATURE ON SPECIALIZED FORECASTING TECHNIQUES

Compiled by: *Mary L. Rice*

During the past few years the literature on forecasting (short range, numerical, objective, extended, and long range) has been so voluminous that a backlog of several hundred abstracts has accumulated in the process files of *MAB*. Hence it was thought expedient to run a special section, in place of a Special Bibliography, to include only articles on special types of short range forecasting such as dew, frost, fog, hail, thunderstorm, upper wind, contrail, etc. The number of papers turned out to be so great that it was necessary to exclude all papers on numerical, extended, hydrological, sea ice, or ocean wave forecasting. These will be run in a later issue. Even with this restricted coverage, about 150 abstracts have been included and an equal number in the hydrological category have been reserved for the June issue.

To make the compilation more useful, without repeating any items previously run in *MAB*, the most important items on each special subject have been referred to in brackets in the detailed subject outline which follows. In several of the special bibliographies previously published, a great number of articles on forecasting special elements were included (e.g., thunderstorms, hail, tornadoes, dew, frost, fog or stratus, upper winds, hurricanes, storm tides, turbulence, icing, glaze and rime, evaporation, visibility, auroras, jet streams, sferics, tropopause conditions, vertical motion, inversions, etc.). The particular issue where this material will be found is referred to (in many cases) at the end of the bracketed references to the subject in question. In other cases it may be found by referring to the list of special bibliographies on page iii of this issue. More complete coverage of the material on **Objective Forecasting, Numerical Forecasting** and **Extended or Long Range Forecasting** will be found in the May 1952, June 1954 and Jan. and Feb. 1951 issues of *MAB*, respectively. It should be emphasized that this is not a special bibliography covering the field exhaustively or even selectively, but rather a compilation of abstracts of recent material (not previously published in *MAB*), with sufficient merit to be brought to the attention of meteorologists, with a minimum delay.

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1. GENERAL CIRCULATION

8C–1 551.509.318:551.515.

Brádka, Jan, **Přirozené synoptické období a jeho závislost na atlantické frontální zoně.** [The natural synoptic period and its dependence on the Atlantic frontal zone.] *Meteorologické Zprávy*, Prague, 8(3):61–65, June **1955.** 9 figs., table, 14 refs. Russian and German summaries p. 61. **DWB**—"Natural synoptic periods" of the Multanovskiĭ school are compared with the German "Grosswetterlage." It is shown that natural synoptic periods are more useful in the analysis of circulation systems. A few shortcomings of PAGAVA's method of forecasting circulation types are pointed out. The relation between frontal zones over the Atlantic and the onset of natural synoptic periods in Europe is then discussed. Finally, connections between places of development of new frontal zones over the Atlantic and anticyclone movement over Europe during the following days are indicated. *Subject Headings:* **1. Natural synoptic periods 2. Frontal zones 3. Forecasting circulation types.**—*Trans. of author's abstract.*

8C–2 551.509.317:551.51

Jílek, Josef, **Advektivně dynamická methoda v synoptice.** [Advective-dynamic method in synoptic meteorology.] *Meteorologické Zprávy*, Prague, 5(1):4–6, **1952.** figs., 4 refs., eqs. **DLC**—Explains the "advective dynamic method" of synoptic analysis developed by the Russian scientists POGOSIAN, TABOROVSKIĬ and KIBEL'. The method concerns relations between the thermobaric field, advective pressure changes and the development and decay of fronts and cyclones. In practical synoptic meteorology this method is particularly useful for predicting the thermobaric field or advection, by means of 700 mb data and dynamic changes. Applications for the general meteorologist are mainly connected with air-mass classification. *Subject Headings:* **1. Advective dynamic forecasting 2. Synoptic Meteorology 3. Kibel's method of forecasting 4. Cyclogenesis forecasting**—*G.T.*

8C–3 551.509.311:551.515.1

Messina, Vittori; Palmieri, Sabino; Pellegrini, Francesco; Simonetti, Dono and Todaro, Cosimo. **Evoluzione ciclonica al suolo e divergenza alla quota del getto nelle applicazioni sinottiche.** [Synoptic applications of cyclone development at ground level and divergence at the altitude of the jet stream.] *Rivista di Meteorologia Aeronautica*, Rome, 16(3):3–21, July/Sept., **1956.** 19 figs., 6 refs. 8 eqs. Italian, French, English and German summaries, p. 3. **DLC**—Surface, 850 mb, 700 mb and 300 mb charts are presented to illustrate 4 situations (in Jan. and Feb., 1956) of cyclogenesis and development over Western Europe and the Western Mediterranean. The surface development is shown to correspond to the thermal field in the surface layers and to divergence at the 300 mb level. Empirical objective rules are demonstrated for estimating the amount of divergence on the 300 mb chart from the isotachs and isohypse configurations. *Subject Headings:* **1. Cyclogenesis forecasting 2. Divergence computation 3. Synoptic case history studies 4. Northern Italy.**—*M.R.*

2. ATMOSPHERIC DISTURBANCES

8C–4 551.509.5:551.515.3(758)

Armstrong, Harry (*U. S. W. B., Airport Station, Atlanta, Ga.*), **Forecasting tornadoes in Georgia.** *Monthly Weather Review*, 81(9):290–298, Sept. **1953.** 10 figs., 13 refs. **DWB**—Some climatological data on the seasonal, diurnal and geographical distribution of tornadoes in Georgia are presented, and the tornado "season" is defined as occurring from Feb. through April. Twelve different storms producing tornadoes during one or more 12-hr forecast periods are studied for synoptic similarities. A mean tornado sounding and a 700 mb composite chart, taken from data preceding tornado occurrences, are shown. Large differences are found in surface map types whereas at the 700 mb level there are striking similarities. The synoptic similarities are incorporated into an objective forecast aid through a stratification process such that most "no-tornado" cases are quickly dismissed by an inspection of the maps currently available in forecast offices, whereas "threat" cases must be further checked against the criteria and four scatter diagrams. Tests show that this aid, when used as a method in itself, correctly anticipates most of these storms and at the same time, it results in about $2\frac{1}{2}$ forecasts of tornadoes for every one reported. *Subject Headings:* **1. Tornado distribution 2. Tornado forecasting 3. Synoptic conditions for tornadoes 4. Georgia.**—*Author's abstract.*

8C–5 551.509.52:551.551

Bates, Ferdinand (*SELS Center, U. S. W. B. Airport Station, Kansas City, Mo.*), **Technique for predicting severe turbulence utilizing the effective gust as a defining parameter.** U. S. Weather Bureau, Jan. 15, **1951.** 22 p. 6 figs., 6 refs., eqs. **DWB**—A procedure for predicting severe turbulence in terms of defined classes by maximum effective gusts is proposed and developed. The

echnique is basically similar to current techniques using indices to potential energy of instability. n effort is made to develop the technique on a physical basis with statistical links. The primary bjective is the increase in utility of severe turbulence forecasts by clearer definition and a further assing. *Subject Headings:* **1. Turbulence forecasting 2. Forecasting techniques.**—*Author's bstract.*

8C–6 551.509.317:551.515.127

Bayly, Donald C., **A density analysis of a developing deep trough in the westerlies.** Thesis M.Sc.)—U. S. Naval Postgraduate School, Monterey, Calif., **1952.** 30 p. 9 plates (folded), figs., 9 refs., 5 eqs. Carbon of typescript. **DWB**—This paper presents an investigation of a rapidly eepening trough in the westerly zonal circulation over the U. S. Material was gathered during a ontinuous five day period at intervals of 24 hrs in a dense radiosonde network. The analysis was onducted in 2 km layers from the surface to 20 km with density as the primary synoptic variable. he purposes of this investigation were first, to present in detail the changes in the density field over he U. S. during the development of an unusually deep trough; second, to determine the primary actors causing the development and the ensuing effects of this development upon the pressure attern at the ground; and lastly, to investigate as many dynamic and synoptic features of the ystem as possible in order to further the understanding of all factors influencing the weather. *ubject Headings:* **1. Synoptic aerological studies 2. Upper level trough development.**—*Author's bstract.*

8C–7 551.509.31:551.515.73

Bugaev, V. A., **Malopodvizhnye antitsiklony.** [Slow-moving anticyclones.] (In: Akademiia auk SSSR, Institut Geografii [and] Institut Lesa, **Mikroklimaticheskie i klimaticheskie issledoaniia v Prikaspiiskoi Nizmennosti,** Moscow, **1953.** p. 30–41. 10 refs.) **DLC**—New rules of short ange forecasting of the appearance, continuance, and disintegration of slow-moving anticyclones ave been worked out on the basis of qualitative analyses of the troposphere's hydrodynamic fields esulting from I. A. KIBEL's theory. The author analyzed several cases of the process of appearance nd development of slow moving anticyclones and disclosed a series of general features of the hyrodynamic field of the troposphere which are characteristic for the occurrences of these cyclones. *ubject Headings:* **1. Short range forecasting 2. Anticyclone forecasting 3. Anticyclogenesis Hydrodynamics.**—*A.M.P.*

8C–8 551.509.312

Carson, Robe B. (*Miami W. B. Airport Station*), **The asymptote as a synoptic tool.** Miami, Veather Bureau Airport Station, July 21, **1955.** 14 p. 2 charts (fold.), 12 refs. Carbon of typeript. **DWB**—Following PALMER's ideas of tropical analysis, the author goes to great length to nphasize the unreality and uselessness of conventional pressure, pressure change, trough-ridge or ontal analyses in locating bad weather (cloud or squall) areas in the tropics. He demonstrates he system of isotach analysis based on the concept of the asymptote (positive or negative) giving clear picture of local confluence or diffluence areas. It is emphasized that configuration of asymptote alone does not indicate convergence or divergence unless speed of inflow and outflow are also onsidered. Synoptic examples for Caribbean and East Coast area in June and July 1955 are resented on charts and discussed. The main disadvantage lies in difficulty in maintaining conuity in analyses. *Subject Headings:* **1. Isotach analysis 2. Tropical cyclone forecasting Asymptote analysis.**—*M.R.*

8C–9 551.509.32:551.515.4:551.543:551.571.3(45)

Cavo, Angioletta, **Alcuni caratteri dei temporali a Genova.** [Some characteristics of thunderorms at Genoa.] *Geofisica e Meteorologia,* Genoa, 3(4/5):112–114, July/Oct. **1955.** 3 figs., 9 refs. **WB**—On the basis of 35 years of data, the author examines the relationship of thunderstorms at enoa to atmospheric pressure and atmospheric temperature and vapor pressure. Graphs showing he frequency of mean daily atmospheric pressure at Genoa (1920–54) and number of days with orms, the probability of storms as a function of atmospheric pressure, and the behavior of vapor ressure at Genoa and La Guardie at times preceding thunderstorms are presented. Vapor pressure as found to reach a maximum 4 hrs before the onset of a thunderstorm. *Subject Headings:* **Thunderstorm forecasting 2. Thunderstorm-pressure relationships 3. Thunderstorm-vapor ressure relationships 4. Genoa, Italy.**—*I.L.D.*

8C–10 551.509.32:551.515.4

*Crawford, Herbert D. (*U. S. W. B., Kansas City, Mo.*), **An objective method for predicting on-thunderstorm days at Lynchburg, Virginia.** U. S. Weather Bureau, Aug. **1954.** 11 p. 3 tables. Mimeo. **DWB**—Thirty years of Northern Hemisphere Sea Level charts and of local weather records

for Lynchburg, Va., are used to develop and check an objective method of forecasting one to three day periods of "no-thunderstorm" in the Lynchburg area for the summer months. The probability that a non-thunderstorm day will follow a clear sky at 0730 EST was found to be 86% (1st decade 86%, 2nd 88% and 3rd 82%). By considering proximity of fronts an increase in overall probability of a non-thunderstorm day is raised to 90% (0.61 success over climatology), but it restricts the number of possible forecasts which can be made, so should be used with caution. Check was made by dividing 30 years into 3 decades. *Subject Headings:* **1. Objective fair weather forecasts 2. Non-thunderstorm days 3. Agrometeorological forecasts 4. Lynchburg, Va.**—*M.R.*

8C–11 551.509.5:551.515.3

§Donn, William L.; Rommer, Richard and Press, Frank, **Atmospheric oscillations at Oklahoma City during the 1953 tornado season.** Columbia Univ. Lamont Geological Observatory, Contract AF 19(122)-441, Technical Report on Meteorology, No. 2, Nov. 1953. 12 p. table, 13 figs., 5 refs. **DWB**—In one case a pressure jump, recorded elsewhere and associated with tornados at some distance, was anticipated by 1½ hrs by the microbarovariograph. A microbarovariograph in the basement of the U. S. Weather Bureau at Oklahoma City recorded pressure jump phenomena too small to be detected by ordinary barographs. A network of such instruments would show whether these features are propagated and have any value in forecasting tornados. Several cases in May-July 1953 involving local thunderstorms are analyzed, and data, recorder records, etc. presented. *Subject Headings:* **1. Tornado forecasting 2. Pressure jump 3. Microbarovariographs.**—*M.R.*

8C–12 551.509.32:551.515.3

§Farthing, E. D., **Note on tornadoes and their forecasting.** *Trans World Airlines, Inc., Kansas City, Mo., Meteorological Technical Bulletin*, No. 50-3, April 14, 1950. 5 p. Also: his **Application of the tornado forecasting procedures outlined in 50-3.** *Ibid.*, No. 50-4, Aug. 14, 1950. 5 p. 6 figs. Also: Trans World Airlines, Inc., K. C., Mo., **Theory of tornado formation.** *Ibid.*, No. 50-5, Nov. 13, 1950. 3 p. 2 figs., 9 refs. **DWB**—Summary of climatic knowledge of tornadoes, rules for forecasting from upper air lapse rate of moisture data, etc., and examples of application of these rules or procedures. Showalter Stability Index, jet stream, thickness of layer where wet-bulb lapse rate exceeds any adiabatic lapse rate, lifting level of free convection and other indications are used. *Subject Headings:* **1. Tornado forecasting 2. Showalter's Stability Index.**—*M.R.*

8C–13 551.509.32:551.515.3

Farthing, E. D., **Procedures employed by the U.S.A.F., Severe Weather Forecasting Center Tinker Field, Oklahoma.** *Trans World Airlines, K. C., Missouri, Meteorological Technical Bulletin* No. 52-2, Sept. 24, 1952. 8 p. fig., table. **DWB**—A fairly detailed summary of the micro-analytical methods used at Tinker Field, Oklahoma by the Fawbush-Miller group of the USAF for forecasting hail, turbulence, severe thunderstorms and tornados. The various charts analyzed, the indices, some of the tables and nomograms used, are reproduced. *Subject Headings:* **1. Severe storm forecast procedures 2. Tornado forecasting I. Fawbush, E. J. II. Miller, R. C.**—*M.R.*

8C–14 551.515.83

Frank, S. R., **Computation and use of acceleration in forecasting.** *Trans World Airlines, Inc. K. C., Missouri, Meteorological Technical Bulletin*, No. 51-2, Feb. 21, 1951. 2 p. **DWB**—A formula $\frac{V_2 - V_1}{\text{time interval}}$, is suggested for quantitative calculation of acceleration A of any system, assuming constant acceleration (valid only for short time intervals). Its use is illustrated for an example of acceleration, and of deceleration of a low, using time interval of 6 hours (between synoptic charts). It can be used for movements of lows, highs, fronts and for ceiling or precipitation changes, etc. *Subject Headings:* **1. Acceleration computations 2. Frontal movement calculations.**—*M.R.*

8C–15 551.509.58:551.515.13

Frank, S. R., **Thermal patterns on CP charts as an aid in steering surface pressure systems** *Trans World Airlines, Inc., K. C., Missouri, Meteorology Technical Bulletin*, No. 49-4, [1949] 3 p. figs. **DWB**—Rules are set forth and illustrated for forecasting steering of surface systems with varying isothermal-contour orientation. If the isotherms and contours are parallel, the surface systems will be steered by the contours. If not parallel, the deviation from contours will be: 1) to left of contour if thermal vector points to right of wind vector, and 2) to right of contour if thermal wind vector points to left of wind vector. A level must be chosen which is above the top level of the closed system at the surface. Standard levels may, but do not need to, be used. *Subject Headings:* **1. Steering of closed pressure systems 2. Isotherm-isohyps relation to steering 3. Cyclone movement forecasting.**—*M.R.*

8C–16 551.509.317:551.515.11

Frost, E. S. [**Forecasting the deepening or filling of low pressure areas in conjunction with the et stream at about 300 mbs.**] *Trans World Airlines, Inc., K. C., Missouri, Meteorological Technical Bulletin*, No. 52-1, April 2, **1952.** 4 p. figs. **DWB**—A summary with illustrations of the latest echniques in forecasting deepening or filling near the jet stream at 300 mb, explaining why some lows leepen and accelerate while others decelerate and fill, contrary to the expected situations. (*See* rticle by Gulick, 8C–138.) *Subject Headings:* **1. Forecasting deepening or filling 2. Jet stream ffects on cyclogenesis. I. Gulick, J. R.**—*M.R.*

8C–17 551.509.32:551.515.4

Frost, E. S. and Frank, S. R., **Preliminary report on 24 hour prognostications based on the 300 nb and associated 24 hour isallotherm charts.** *Trans World Airlines, Inc., K. C., Missouri, Meeorology Technical Bulletin*, No. 49-5, [**1949**]. 5 p. **DWB**—Tests of forecasts of nocturnal thunderstorm activity in the Midwest in connection with deep temperature troughs at 300 mb 24 hrs prior o thunderstorms. The line of activity was found to parallel the trough providing winds at 300 mb vere blowing perpendicular to or through the trough. It was found that thunderstorms were always ssociated with such a trough, but a trough did not always mean thunderstorms would occur subequently. Improvement of tool with respect to latter defect was made by introducing isallothermsotherm charts (superimposed). If two patterns are parallel instability is indicated; if not, greater tability and hence less chance of activity is expected. *Subject Headings:* **1. Thunderstorm forecastng 2. 300 mb trough movement 3. Midwest, United States.**—*M.R.*

8C–18 551.509.32:551.515.4

Gardner, J. M. [**Use of Stability Index charts in thunderstorm forecasting.**] *Trans World Airlines, Inc., K. C., Missouri, Meteorological Technical Bulletin*, No. 50-1, March 21, **1950.** 2 p. **DWB**—Stability Index charts prepared between March and Sept. 1949 by 3 forecast centers showed hat 96% of thunderstorms occurred after a Stability Index value of +4 or less, but large areas vith corresponding index values showed no thunderstorms. Other factors were checked (400 and 50 mb temperature changes, 850 mb specific humidity, etc.) and are evaluated. Temperature-ewpoint spread at the 850 mb level gave the best correlation. All thunderstorms occurred within 2 hrs of a spread of 14°C or less. Thus by drawing isopleths of Stability Index values of +4 and pread of 15°C at 850 mb giving much improved bracketing of active areas. *Subject Headings:* **. Thunderstorm forecasting 2. Showalter's Stability Index.**—*M.R.*

8C–19 551.509.58:551.515.13

Hering, Wayne S. and Mount, Wayne D. (*both, A. F. Cambridge Research Center, Mass.*), **Cvaluation of techniques for predicting the displacement of north-eastward-moving cyclones.** *American Meteorological Society, Bulletin*, 37(2):55–60, Feb. **1956.** 4 figs., table, 5 refs. **DWB, DLC**—The authors carry out an evaluation of various rules and methods used to forecast the 30-hr isplacement of a cyclone class (termed Category IV by the meteorology staff of Eastern Air Lines) uring the winter seasons in the Eastern United States. Sixty-three storms of this classification, aving a track from the SW and steered by SW flow aloft, were analyzed. The normal movement f these storms is defined. The various methods tested are those of extrapolation, the Bowie and Veightman climatological tables in the mean monthly 24 hr speed and direction of cyclonic centers n the U. S., steering principles and Palmer's technique for forecasting the direction of movement of vinter cyclones in the U. S. *Subject Heading:* **1. Cyclone movement forecasting.**—*I.L.D.*

8C–20 551.509.52:551.515.2(5)

Kadoya, Kyugoro, **A method for predicting the formation of typhoon.** *Journal of Meteorological Research*, Tokyo, 6(9):470–471, **1954.** 3 figs., tables, 2 refs. In Japanese. **DWB**—On the basis of ata for 1936–52, the author pointed out a 9–10-year cycle in the generation of typhoons in the Far East. Also when a trough advances from pole to equator along about 100°E-meridian, a typhoon sually generates. *Subject Headings:* **1. Typhoon formation 2. Typhoon forecasting 3. Far East.** —*H. Arakawa.*

8C–21 551.509.32:551.558.1

Koldovsky, Milan, **Několik poznámek k prognose konvektivního proudění.** [Some remarks n the forecasting of convection currents.] *Meteorologické Zprávy*, Prague, 7(1):18–23, Feb. **1954.** figs., table, 4 refs., eqs. **DLC.** English translation, 14 p. Photostat No. 332. 7 figs., table, refs., eqs. **DWB**—After criticizing two current methods of predicting convection currents (the ir parcel method and the horizontal section method) the author explains a technique based on a dialectic approach to the problem." An aerological emagram is used for determining convection emperature, condensation level and convective cloud top heights. Speed of vertical currents is alculated according to the size of energetic fields. The method is applicable to forecasting cloud

conditions, precipitation, thunderstorms and icing hazard. It is also claimed to permit corrections on account of stabilization of the atmospheric stratification. In a note appended to the article Z. GREGOR states that forecasting of convection currents, as practiced by the Czechoslovak Meteorological Service is not limited to the use of conservative methods (as charged by KOLDOVSKÝ), but that the method suggested by KOLDOVSKÝ depends too much on the (at present insufficient) accuracy of aerological measurements and its use at this point would be unjustified "idealism." *Subject Headings:* **1. Convection currents 2. Convection current forecasting. I. Gregor, Z.**—*G.T.*

8C–22 551.509.317:551.515.8

Khromov, Sergeĭ Petrovich, **Chromov's synoptic rules.** *U. S. Air Weather Service, Technical Report,* No. 105-85, Feb. **1952.** 24 p. eqs., bibliog. p. 23–24. Photostat. **DWB**—"This is a translation into English of section 74 of the 1940 German translation (by G. SWOBODA and N. KONČEK) of the second revised Russian edition, 1937, of KHROMOV's **V Vedenie Synopticheskii Analyz.** First Russian edition appeared 1934. Third Russian Edition, 1941." The first Russian edition was based on notes which KHROMOV took in 1932 from BERGERON's lectures on Synoptic Meteorology in Moscow. These notes were expanded from 1934–36 and the present translation contains 177 semi-empirical rules for forecasting movements of air masses, fronts, cyclones, and upper winds, troughs, isobars, isotherms, convergence, divergence, etc. *Subject Headings:* **1. Forecasting rules 2. Synoptic forecasting 3. Frontal movements. I. Bergeron, Tor II. Swoboda, G. III. Konček, N.**—*M.R.*

8C–23 551.509.32:551.515.31

§Lee, Jean T. (*U. S. W. B. Airport Station, K. C., Mo.*), **Thunderstorms and tornadoes of February 1, 1955.** Monthly Weather Review, Wash., D. C., 83(2):45–51, Feb. **1955.** 10 figs., 3 refs. **DWB**—A synoptic-aerological analysis of the situation on Jan. 31 and Feb. 1, 1955 which gave rise to the first severe storms and tornadoes of the season in the Little Rock-Memphis area and to the eastward in Mississippi and Alabama. Over 125 people were injured and 23 killed. The tornadoes occurred in the center and to the east of the area for which tornadoes were forecast at 0900 CST. Those which proved fatal were all within the forecast area. Frontal, surface (3-hourly), 850, 700, 500 mb and adiabatic charts are presented. A bubble of moist air not advected but probably of convective origin appearing at 0900, Feb. 1 at Little Rock was one of the strongest indications although Showalter Stability Index, etc. all indicated tornado activity. *Subject Headings:* **1. Tornado forecasting 2. Tornado analysis 3. Lower Mississippi Valley.**—*M.R.*

8C–24 551.509.58:551.515.2:622.323

McClelland, Marshall K., **Oil and weather in the tidelands.** *World Petroleum,* 24(10):98–99, Sept. **1953.** 3 photos. **DLC**—A vividly written account of the career and functions of the industrial or consulting meteorologist, NASH C. ROBERTS, who directs the operations of an off-shore oil drilling company in the Gulf of Mexico (tidelands of the Louisiana Coast) during periods when hurricanes or adverse winds threaten. By precise and personalized forecasting he enables this company to operate until the last moment when safety demands shutting down or, as in most cases, to continue without interruption when other companies shut down completely for storms that are near but do not actually strike the point of operations. *Subject Headings:* **1. Industrial meteorologists 2. Hurricane forecasting 3. Off shore oil industry. I. Roberts, Nash C.**—*M.R.*

8C–25 551.509.31:551.515.8(52)

Matsumoto, S.; Itoo, H. and Arakawa, A. (*Met. Res. Inst., Japan*), **On the cut-off lows observed on June 12 and 18, 1951 over Japan.** *Meteorological Society of Japan, Journal,* 2nd Ser., 32(2):53–56, Feb. **1954.** In Japanese; Legends in English abstract. 2 figs., 11 refs. **DWB**—A vertical time section over Wajima, Japan (June 11–21, 1951) showing relative humidity, double tropopause, polar front, baric front, lapse rate, and a vertical cross section along the Japanese islands (June 18) are presented and commented on. The sections illustrate the synoptic development leading to the cold vortex over Japan on June 18, 1951. *Subject Headings:* **1. Fronts 2. Polar vortexes 3. Frontal analysis 4. Cross sections 5. Wajima, Japan 6. Japan.**—*G.T.*

8C–26 551.509.31:551.515.8

§Michalczewski, Jerzy, **Fronty wtórne z dniz 23. V. 1950 r.** [Secondary fronts of May 23, 1950.] *Przegląd Meteorologiczny i Hydrologiczny,* Warsaw, 6(1/2):71–78, **1953.** 6 figs. English summary p. 78. **DWB**—The question of the helpfulness of drawing secondary fronts, especially in cases of cold fronts, because cold air masses are seldom uniform and each of them alters the situation, is discussed and upheld by the author, particularly for aviation meteorology. The theoretical argument is sustained by an analysis of the weather situation on May 23, 1950 in Central Europe and the Baltic, showing that a correct study of synoptic charts and a proper evaluation of the speed of the

ontal movement permits making an accurate forecast of their passage and of the changes of meorological elements connected with them. *Subject Headings:* **1. Frontal analysis 2. Secondary onts 3. Central Europe 4. Baltic Region.**—*A.M.P.*

8C–27 551.509.32:551.515.4

Muchnik, V. M., **Nekotorye voprosy prognozirovaniia groz.** [Some problems of thunderstorm recasting.] *Meteorologiia i Gidrologiia, Leningrad,* No. 3:32–33, March **1956.** 5 tables, 3 refs. **WB, DLC**—For various points in the Ukraine data are given on the height of the 0° isotherms uring thunderstorms, showers, and storms, the frequency of different elevations of the 0° isotherm uring showers and thunderstorms, the frequency of thunderstorms as a function of temperature the earth's surface, etc. The mean height of the 0° isotherm for thunderstorms is 500–1000 m. gher than for showers during April, May, June and Sept.; the maximum frequency of the 0° otherm height for thunderstorms is between 2000–5000 m when it is between 1500–2500 m for iowers. The frequency of thunderstorms is very small when the surface temperature is less than 3°C. The smallest area for which thunderstorm occurrence can be forecast reliably for a single oint was 50 km both in the case of frontal and nonfrontal thunderstorms. *Subject Headings:* **Thunderstorm forecasting 2. Ukraine, U.S.S.R.**—*I.L.D.*

8C–28 551.509.32:551.515.8

Porter, John M. (*U. S. W. B. Forecast Center, Chicago*); Means, L. L.; Hovde, J. E. and Chappell, J. B. (*U. S. W. B.*), **Synoptic study on the formation of squall lines in the North Central United tates.** *American Meteorological Society, Bulletin,* 36(8):390–396, Oct. **1955.** 8 figs., 9 refs. **DWB**—The aim of this study was to discover synoptic conditions which favored squall-line formation in ie north-central United States. The squall lines over approximately a three-year period were assified into three types and studied using charts from the surface to 200 mb. Although the various arameters were not reduced to a strictly objective technique, a check list of significant parameters as prepared for the use and guidance of forecasters. It is believed that this check sheet will help ie forecaster in forecasting squall-line development in the north-central United States. *Subject Headings:* **1. Squall line forecasting 2. United States.**—*Authors' abstract.*

8C–29 551.509.53:551.515.8(782)

§Rigney, S. J. and Bristor, C. L., **Forecasting cold waves in the Nebraska panhandle.** U. S. Weather Bureau, Dec. **1951.** 4 p. 6+figs., ref. **DWB**—An objective study for forecasting cold aves, especially those without blizzards, on the east slope of the Divide in Nebraska. Actual ynoptic cases are analyzed, giving an "ideal" cold wave model involving plentiful cold air to N, small wave or low in the Pacific Northwest and no following low farther west, and a weak Great asin High. Twelve months of winter data (Nov.–March) were used in development (1943–951), and 5 test months (1945–1948) used in checking. A number of modifications and exceptions, s well as the typical cases, are noted. *Subject Headings:* **1. Cold wave forecasting 2. Objective old wave forecasting 3. Western Nebraska. I. U. S. Weather Bureau.**—*M.R.*

8C–30 551.509.32:551.515.3

Tepper, Morris; Fujita, Tetsuya and Newstein, Herman, **Micro-analysis: an important scale n the analysis of weather data.** Presented at the American Meteorological Society meeting, Wash., D. C., May **1955.** 54 p. Mimeog. **DWB**—Macro- and micro-analysis are defined, and mesonalysis proposed for events of a 10–50 mi size or networks of that order of grid interval. In severe torm analysis it is found that pressure-jump lines are about 100 miles long and last a few hours. These systematic motions are lost or appear random on the normal synoptic grid (100 mi space and -hourly time interval). The events of June 24–25, 1953 are used to illustrate the value of mesonalysis with a dense synoptic network in the Great Plains area, during severe storm-tornado situaion. *Subject Headings:* **1. Mesometeorological networks 2. Severe storm forecasting.**—*M.R.*

8C–31 551.509.58:629.13(02)

U. S. Air Weather Service, **Severe weather forecastings; a digest of procedures used by the Air Weather Service, Severe Weather Warning (Thunderstorm) Center.** *U. S. Air Weather Service, AWS Manual,* No. 105-37, Nov. 1, **1952.** 63 p. 44 figs., 5 tables. **DWB**—The purpose of this manual is "to provide station weather officers with an understanding of how the severe weather warnings which are transmitted on Air Force Weather teletype circuits in the U. S. are prepared." The term "severe weather" is defined as comprising tornado activity, severe thunderstorms, hail, and turbulence. Methods used in forecasting the occurrence of these phenomena are described in sections 2 to 5 of the manual. They are based on accepted forecasting techniques and on empirical rules derived by the SWWC. The application of these rules is explained with the help of practical examples and of sample charts. *Subject Headings:* **1. Airways forecasting 2. Severe storm forecasting 3. Manuals.**—*G.T.*

8C–32 551.509.32:551.5

*U. S. Air Weather Service, **Tornadoes and related severe weather: an informational digest Air Commanders, revised June 1955.** Wash., D. C., U. S. Air Force, **1955.** 8 p. fig., 2 cha table. **DWB**—A review of methods of tornado, hail and severe thunderstorm forecasting, v charts showing frequencies of tornadoes per 50-mi square, and of tornadoes sighted within 60 of an Air Force base (1920–49) throughtout the U. S. The greatest frequency (>15) was in east Kansas and western and central Iowa. Tornado forecast verifications for each year 1948–54 given in a table. About 90% or over of the forecasts of tornadoes in 1948–51 verified, and abou of those in 1952–54, years of much greater tornado frequency. A few cases each year (11– occurred when no forecast of tornadoes was issued. *Subject Headings:* **1. Tornado forecast 2. Tornado forecast verification 3. Tornado frequencies 4. United States.**—*M.R.*

8C–33 551.509.32:551.515.3

U. S. Weather Bureau. SELS Center Staff, K. C., Mo., **SELS forecasting procedures.** Feb **1955.** 27 p. 19 figs., 20 refs. **DWB**—A manual outlining the latest procedures for forecast danger of tornadoes, severe thunderstorms, hailstorms (where stones ¾ in. or larger are expecte or severe turbulence, including a review of: geographic, seasonal and diurnal distribution of tornad air mass types, objective methods, thermodynamic and dynamic considerations (jet stream, press jump, etc.), analysis of charts and diagrams, hail size forecasting, severe turbulence and, fina thunderstorm surface wind gust forecasting. A score of sample adiabatic charts, shear-stabi charts, etc. are appended. Showalter's Stability Index is considered. A convenient and v simple indicator of tornado or severe storm probability, but further analysis of depth of moist la etc., must be made to pinpoint the exact areas where severe storm will occur. *Subject Headi* **1. Severe storm forecast procedures 2. Tornado forecasting manuals 3. Hail size forecasti** —*M.R.*

8C–34 551.509.312:551.509.

Venkateswara Rao, D. (*Regional Met. Center, Madras*), **Correlation of pressure changes at surface with those in the upper atmosphere over India and neighbourhood.** *Indian Journal Meteorology and Geophysics*, New Delhi, 6(3):207–216, July **1955.** 8 tables, 7 refs. **DLC**— nature of the relationship between the pressure changes in the atmosphere at the 300 and 200 levels and the concurrent and subsequent pressure changes at the surface have been examined this paper, analyzing the data for 15 radiosonde stations in India and neighborhood, during period July 1944 to June 1945. The correlation between the changes aloft and the surface chan 24 and 48 hrs later have been found to be generally negative. Tetrachoric correlation coefficie have been worked out to assess the magnitude of such out-of-phase correlation and these have b compared with the corresponding values in the U. S. The correlation data have been disper with respect to the different seasons of the year and the major regions comprising the Indian a It has been found that the negative correlation is maximum during the period November to Ma and minimum when convective activity is predominant. It is felt that a study of the press fluctuations at the coastal radiosonde stations in the field of depressions and storms in the Bay Bengal and the Arabian Sea might materially help in anticipating the courses these may subsequen take. *Subject Headings:* **1. Upper air analysis 2. Pressure correlations 3 Cyclone forecasting** *Author's abstract.*

8C–35 551.509.32:551.551:551.5

Visscher, Hubert B., **Remarks on [Ferdinand C. Bates:] A technique for predicting extre turbulence related to thunderstorms.** *American Meteorological Society, Bulletin*, 37(1):36, Jan. 19 4 refs. **DWB, DLC**—It is pointed out that in relating actual values of effective gust velocities v draft velocities, Bates (*see* 7.10–199, Oct. 1956, *MAB*) has not related the actual values of d velocities to the thermodynamic parameters derived from the radiosonde soundings, and t Whiting's "impact factor" enters directly into the creation of turbulence and not solely thro any linkage such as "augmentations of the positive area through lifting." *Subject Headi* **1. Thunderstorm turbulence 2. Gust forecasting.**—*I.L.D.*

8C–36 551.509.32:532

§Walden, H., **Dünung: Sturmzeichen oder nicht? Teil 2.** [Sea swell: storm indication or n Pt. 2.] *Seewart*, Hamburg, 16(3):81–87, June **1955.** 3 figs., table. **DWB**—Data on period height of swell, fetch and time required for swell to travel from the storm center to the observat point are analyzed for typical cases in the North Atlantic. It is concluded that when an increas irregular and slowly shortening and steepening swell reaches 1/50 slope without change in direct one must expect the swell to originate in an approaching storm field. This is especially tru cirrus clouds are rapidly approaching and increasing in density. Not all moving storms are

mpanied by such swell and vice versa. Nomograms and synoptic examples are presented. *Subject eadings:* **1. Storm forecasting from swell 2. Storm swell 3. North Atlantic.**—*M.R.*

8C–37 551.509.32:551.515.3 551.509.32:551.515.4

§†Winston, Jay S., **Forecasting tornadoes and severe thunderstorms.** U. S. Weather Bureau, orecasting Guide, No. 1, Sept. **1956.** 34 p. 42 figs., 55 refs. **DWB**—This review of the field of rnado forecasting includes a historic summary, data on the geographic, seasonal and diurnal stribution of tornadoes in the U. S. (1916–1955), discussion of parameters involved in tornado rmation, forecasting methods, formulation of tornado forecasts, and an example of a forecast. ediction of related phenomena, such as hail size and extreme turbulence is also discussed. *Subject eadings:* **1. Tornado forecasting 2. Thunderstorm forecasting.**—*G.T.*

3. TEMPERATURE

8C–38 551.509.323:551.524.36

Bieler, P. L., **Vérification de la methode de Kammermann pour la prévision du minimum de mpérature à Cointrin.** [Verification of the Kammermann method for forecasting of minimum mperature at Cointrin.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen,* 1952, p. 130, b. **1953. DWB**—The author found that the minimum temperature is 6.8°C ±1.7° lower than the t bulb temperature at 21 hrs, comparing with the value 4.2°C ±1.7°, given by KAMMERMANN. ost never occurred if the 16 hr temperature was higher than 8.5°C. Frost damage exists when the w point at 16 hr is below 3°C. *Subject Headings:* **1. Minimum temperature forecasting 2. Frost recasting 3. Kammermann's formula.**—*A.A.*

8C–39 551.509.323:551.524.36

Bontrond, E. A., **Quelques indications pratiques concernant la prévision des temperatures tremes sous abri.** [Practical suggestions for the forecasting of extreme temperatures in shelters.] *Météorologie,* Paris, 4th Ser., No. 29:4–15, Jan./March **1953.** 3 figs. **MH-BH**—This article plains and illustrates a number of rules for local short-term forecasting of minimum temperatures ar the ground, based on air masses, vertical temperature gradient, topography, humidity, wind, ndensation, transparency of atmosphere, precipitation, cloudiness and state of the soil. Synoptic d objective tools are also used as are formulas and graphs. *Subject Headings:* **1. Minimum temrature forecasting 2. Local forecast rules.**—*M.R.*

8C–40 551.509.323:551.524.36

Chambers, S. W. and Snyder, C. H., **Forecasting minimum temperature on second night follow- g a cold air outbreak at Dodge City, Kansas.** Wash., D. C., U. S. Weather Bureau, October 26, **54.** 2 p. table. **DWB**—A study intended as an aid to forecasting minimum temperatures second night after a cold air outbreak at Dodge City, Kan. Based on occurrences of temperature op of 10°F or more from previous days minimum, for 1944–53 (196 cases), it was shown that a mperature drop on the second night usually follows a drop of 10° or more on a given night and the eater the fall on the first night, the greater the probability that the second night will be even colder. ata for Sept.–May are tabulated by month in categories of drops of 10°–15°, 16°–20°, and 21° more, each sub-divided into 3 categories—fall, no change, or rise the second night. *Subject eadings:* **1. Minimum temperature forecasting aids 2. Cold waves 3. Dodge City, Kan.**—*M.R.*

8C–41 551.509.323:551.524.37

Crossan, Thomas R., **Fruit frost forecasting at La Verkin, Utah.** U. S. Weather Bureau (1947). p. table, eqs. Typescript. **DWB**—Formula for minimum temperature forecasts at La Verkin, tah, based on Young's hygrometric method, gives $Y = DP - (RH - 35)$. Table gives corrections r DP+RH based on 1946–47 (March and April) data. Other factors to be considered are noted. *ubject Headings:* **1. Fruit frost forecast formulas 2. Minimum temperature forecasting 3. La erkin, Utah.**—*M.R.*

8C–42 551.509.323:551.524.36

Finkelstein, J., **A test of Brunt's formula for predicting minimum temperatures.** *New Zealand. leteorological Office, Technical Note,* No. 93, Nov. 5, 1952. 7 p. 8 refs. **DWB**—BRUNT's equation as been tested for a number of calm nights when there was no precipitation and no frontal change. he standard deviation of the predicted from the observed minimum temperatures is 2.7°F for aieri, and 3.3°F for Earnscleugh (spring months only at Earnscleugh). For the latter station, owever, BRUNT's equation does not appear to be at all valid unless wide variations in soil moisture ontent are postulated. If overnight cloud conditions can be forecast, it is suggested that the equaon could be used for minimum temperature forecasting at either station on calm nights. For

Earnscleugh, further investigations of variations in soil moisture content and their effect are recon mended. *Subject Headings:* **1. Minimum temperature forecasting 2. Brunt's formula 3. Ne Zealand.**—*Author's abstract.*

8C–43 551.509.323:551.524.3

Gherzi, Ernesto (Macao Obs.), **Nota sobre a previsão das horas de ocorrência das temperatur maxima e mínima e do valor mais baixo da humidade relativa durante o dia.** [Note on the for casting of the times of the maxima and minima temperatures and of the lowest daily relative h midity.] *Macao. Serviço Meteorológico, Notas Científicas,* No. 7/8:1–15, **1953.** table, foot-ref In Portuguese and English. **DWB**—Utilizing data from the Macao Observatory for one year, th author computed the mean time of maximum and minimum temperatures as well as of lowest relativ humidity and shows that the mean difference between these times cannot be used successfully f a forecast without making detailed studies for different air masses. *Subject Headings:* **1. Maximu temperature forecasting 2. Relative humidity 3. Minimum temperature forecasting 4. Maca** —*A.A.*

8C–44 551.509.323:551.524.3

Gilbert, C. G. (*U. S. W. B. Airport Station, Denver, Colo.*), **An aid for forecasting the minimu temperature at Denver, Colo.** *Monthly Weather Review,* 81(8):233–245, Aug. **1953.** 13 figs 4 tables, 12 refs. **DWB**—Research on objective forecasting of minimum temperatures is reviewe and the general approach to the problem at Denver is discussed. The variables selected and th graphical combination of these variables are described in detail. Results of forecasts made b exclusive use of the aid are presented and a comparison is made between these forecasts and th official minimum temperature forecasts issued to the public. It is found that the "system" forecas compare very favorably with the official forecasts and the conclusion is drawn that with continue use of the aid and greater familiarity with its shortcomings the forecasters will be able to consistent improve upon the forecasts produced by the aid and in the long run improve the overall skill forecasting the minimum temperature for Denver. *Subject Headings:* **1. Objective forecastin 2. Minimum temperature forecasting 3. Denver, Colo.**—*Author's abstract.*

8C–45 551.509.323:551.524.3

Horning, F. E. (*U. S. W. B. Airport Station, Denver*), **Forecasting freezing temperatures f Fort Collins, Colorado during the vegetable harvest season.** U. S. Weather Bureau, Feb. 7, 195 6 p. 2 figs., 4 refs. **DWB**—Autumn frost period (Sept. 1–Oct. 20) data for 1946–49 were used dependent data and 1950 used as test data and then incorporated with 1946–49 and used in for casting for 1951 season. Parameters tested were for Casper, and Sheridan, Wyo., and Billing Mont. (cold air masses in autumn come from N). It was found that 27 out of 28 freezing tem peratures at Fort Collins occurred on morning following a minimum of 38°F or lower at one of tho 3 stations. S.L. pressure of 1025 mb at Denver at 0530 previous day completed stratified data in cases with frequency at Fort Collins. Pressure rise in 12 hrs at Casper give further successf stratification of data. Skill score of 0.50 (82% correct) for 1946–50 and 5/7 in 1951. *Subje Headings:* **1. Frost forecast studies 2. Fort Collins, Colo.**—*M.R.*

8C–46 551.509.323:551.524.3

Ichikawa, Y., **Prediction of minimum air temperature in April and May.** *Journal of Meteor logical Research,* Tokyo, 4(12):1039–1041, March **1953.** 4 figs., 2 refs. In Japanese; Engli summary p. 63. **DWB, DLC**—On clear anticyclonic days in April and May with wind <10 k minimum temperature °C is given by

$$T_{16} - 5\,(\text{April}) \text{ or } -7\,(\text{May}) - \Delta t,$$

where T_{16} is air temperature at 16 h and Δt is a correction for air temperature and vapor pressur given by a nomogram. *Subject Headings:* **1. Minimum temperature forecasting 2. Japan.** *C.E.P.B.*

8C–47 551.509.323:551.524.3

Kallós, Mrs. Imre, **A májusi fagyok kialakulása és előrejelzése.** [Formation and forecastin of freezing temperature in May.] *Időjárás,* 58(1):8–14, Jan./Feb. **1954.** 4 figs., ref. Russia and French summaries p. 8. **MH-BH**—Late spring frost affecting agriculture may be classified radiation or advection frost. In forecasting radiation frost so-called frost warning diagrams a used; these do not always yield satisfactory results. As an example of the formation and develo ment of advection frost, the author analyzes the frost situation of May 1952 in Hungary and explai the application of advective-dynamic analysis to such situations. *Subject Headings:* **1. Frost for casting 2. Spring frosts 3. Hungary.**—*Trans. of author's abstract.*

8C–48 551.509.323:551.524.36

Kern, Helmut, **Zur Vorausbestimmung des Temperaturminimums in Strahlungsnächten.** [On forecasting temperature minimum on radiation nights.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:107–109, **1952.** 2 figs., 9 refs. **DWB**—Based on method of A. KAMMERMANN (1886), author gives a table and graph of relation between equivalent temperature and wet-bulb at 14 h and between the former and minimum temperature at Karlshuld. *Subject Headings:* **1. Minimum temperature forecasting 2. Kammermann's formula 3. Karlshuld, Germany.**—*C.E.P.B.*

8C–49 551.509.323:551.524.37

Kopáček, Jaroslav (*Inst. for Meteorology and Climatology, Charles Univ., Czechoslovakia*), **Forecast of minimum temperature by Brunt's method.** English translation, No. 351, source unidentified. Original in Czech, in *Meteorologické Zprávy*, Prague, 6(4):105–109, Sept. **1953.** 10 p. tables, 4 refs., 12 eqs. Ozalid reproduction. **DWB**—Numerous tests of various methods of forecasting frost proved that none could give any more than a simple prediction of frost or no frost. Consequently BRUNT's method has been applied to forecasting actual minimum temperatures during the season when frost endangers crops. It is found that the only drawback is a failure to correctly forecast the cloudiness at night. Advection is no problem if it occurs in the daytime, and it can be taken into account if it occurs at night. Soil type and condition are important. The theory as well as application is elaborated and tables given for rapid calculation under varying cloud and soil conditions. Six cases in 1952 are described. *Subject Headings:* **1. Minimum temperature forecasting 2. Objective frost forecasting 3. Brunt's formula 4. Czechoslovakia.**—*M.R.*

8C–50 551.509.323:551.524.37

§Ku, Chen-chao (*Geophysic Inst., Chinese Acad. of Sci.*), **Preliminary research in the regional forecasting of early and late frost in China.** [Reproduction No. 228 from original in] *Journal of Chinese Meteorology*, Peiping, 25(1):23–46, March **1954.** numerous charts. 27 p. **DWB**—A regional and synoptic study of frost conditions in North China and Manchuria for use as an aid in forecasting first frosts, early frosts (in autumn) and late frosts and last frost (in spring). Advection of cold air behind a cold front is considered to be the main precurser of early and late frosts. The fact that frost may occur when the shade temperature is 5°C and other indications point to a definition of frost as that deposit which occurs on plants rather than a temperature of freezing or lower. Frost regimes are delineated on charts according to dates of first or last frost. Other charts give distribution of frost on specific dates accompanied by surface and 700 mb synoptic charts. *Subject Headings:* **1. Frost distribution studies 2. Frost forecasting 3. China.**—*M.R.*

8C–51 551.509.323:551.524.37

Masatsuka, Akira and Yonekubo, Yoshikatsu, **On the late frost forecasting in Matsumoto Basin, Nagano Prefecture.** *Journal of Meteorological Research*, Tokyo, 6(9):422–432. **1954.** 7 figs., 10 tables. In Japanese; English summary p. 422. **DWB**—To make objective prediction of late spring frost in Matsumoto area, the authors made synoptic and statistical studies for which a work sheet for prediction is provided. *Subject Headings:* **1. Frost forecasting 2. Matsumoto Basin, Japan.**—*H. Arakawa.*

8C–52 551.509.323:551.524.37

Mizon, E. A., **Barossa Valley frost forecasting.** *Australian Meteorological Magazine*, Melbourne, No. 1:8–15, July 1952. 4 figs., 2 refs. Additional comment by R. A. Clarke and by the author, *Ibid.*, No. 2:24–26, Dec. **1952.** Further comment by R. A. Clarke, *Ibid.*, No. 3:38–40, May **1953. DWB**—The topography of the Barossa Valley (just N.E. of Adelaide, S.Australia) is shown on a detailed map and is described briefly. Cooperative temperature stations were installed in 1950 and results compared with 1948–50 temperatures at the Viticultural Station. Results of regression analyses were disappointing as scatter was so great. So BJERKNES' circulation theorem and JEFFREY's treatment of akatabatic wind as an antitriptic wind were used as a basis for making a logical synoptic dynamic survey of the 1948–50 frost seasons which showed that 90% of the frosts occurred with calm or SE to W gradients. Synoptic examples and statistics are presented, and a number of forecast rules set forth. Errors are pointed out by CLARKE. *Subject Headings:* **1. Frost forecast studies 2. Synoptic climatology 3. Barossa Valley, South Australia. I. Clarke, R.A.**—*M.R.*

8C–53 551.509.323:551.524.37

Pejml, Karel, **Vývoj a současný stav předpovědi nočních mrazů v době vegetační.** [Development and present status of forecasting night frost during the growing season.] *Meteorologické Zprávy*, Prague, 8(1):18–22, Feb. 28, **1955.** 3 tables, 4 refs., eqs. Russian and German summaries p. 18. **DWB**—Methods used in forecasting night frost are briefly reviewed. Statistical methods

are useful only for general purposes, their admitted error being ± 3°C. Methods based on the physical and mathematical analysis of the outgoing radiation process provide a more perfect means of forecasting. The author suggests that more attention should be paid to the theory and the practical application of such methods. *Subject Headings:* **1. Nocturnal frost 2. Frost forecasting.**—*Trans. of author's abstract.*

8C–54 551.509.323:551.524.37

Reuter, H., **Zur Praxis der Frostprognose.** [The practice of frost forecasting.] *Wetter und Leben*, Vienna, 7(8/11):258–259, **1955.** 4 refs., eqs. **DLC**—Most precise forecasts of nocturnal cooling can be made at sunset with the aid of the following formula: $\Delta T = F(V) \cdot EW\sqrt{L}$, ΔT temperature change at night (sunset to sunrise), $F(V)$ factor depending upon mean wind velocity and local soil conditions, EW effective radiation during the night with a mean cloudiness W, L duration of night. The use of this formula for frost warning is discussed. *Subject Headings:* **1. Frost forecasting 2. Reuter's nocturnal cooling formula.**—*I.L.D.*

8C–55 551.509.323:551.524.37

Rojecki, Ananiasz, **O "rachunkowej" metodzie przewidywania przymrozkow.** [The "calculation" method of early frost forecasting.] *Gazeta Obserwatora PIHM*, Warsaw, 4(8):10–16, Aug. **1951.** 3 tables. **DLC**—While early spring and autumn advection frosts covering usually wide areas can be forecast with good results by means of general methods of synoptic meteorology, it is much more difficult to forecast early radiation frosts. These forecasts must be based on physical analysis of processes causing the nocturnal drop of temperature in the lowest atmospheric layer. The author introduces the principles and basis of a method developed by I. G. Liutershtein and A. F. Chudnovskiĭ. This method forecasts the expected minimum night temperature with an accuracy of 90% (even 94–97% in some localities). The basis of such calculation are meteorological observations made at 7 P.M. (local time). *Subject Headings:* **1. Frost forecasting 2. Radiation frost.**—*A.M.P.*

8C–56 551.509.323:551.524.37

Simic, B., **O rezultatima predvidanja noćnog mraza po metodi Reinharda Fausta.** [Results of night frost forecasts based on R. Faust's method.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 2(1):21–23, Jan./March **1953.** 2 figs., table. **DWB**—Faust's objective method of forecasting night frost from temperature and vapor pressure at 2 p.m. is reported to have been tested with good results. The tests were made on data for Zagreb (Croatia) and Pozega (Slavonia), covering the months March–April and Sept.–Nov. of the period 1946–1950. *Subject Headings:* **1. Frost forecasting 2. Objective forecasting.**—*G.T.*

8C–57 551.509.323:551.524

Smedley, David (*Ext. Fore. Sec., U. S. W. B., Wash., D. C.*), **Test on the difference between the fixed parameter and roving parameter methods of objective temperature forecasts.** U. S. Weather Bureau, July 1953. fig., charts, 2 tables. Typescript. **DWB**—Objective temperature forecasts were made for 12 five-day periods between Oct. 1951 and Dec. 1952 (for "cold" months only), using the old fixed parameter (temperature anomaly vs. thickness anomaly at a given station which on the whole showed highest correlation), against the "roving" parameter (temperature anomaly vs. thickness at an "upstream" station) selected because of its pertinence to current flow patterns and to bring out maximum gradients. Roving parameter gave 8.75 forecast points out of possible 25 against 7.5 for fixed parameter. In only 1 out of 12 five-day periods did the fixed give better results than the "roving" parameters. Data and skill scores are presented in tables and discussed. *Subject Headings:* **1. Objective temperature forecasting 2. Objective forecasting 3. Roving parameter forecasts.**—*M.R.*

8C–58 551.509.323:551.509.36

Summersby, W. D., **Night cooling under cloudy skies.** *Meteorological Magazine*, London, 82(973):210–213, July **1953.** 3 figs., 2 tables, 2 refs. **DWB**—Corrections for cloudiness to W. E. Saunders' method of forecasting night cooling at Northolt under clear skies (*see* 4.2–60, Feb. 1953, *MAB*) were derived graphically and are given as a table. They are also represented by an exponential curve. *Subject Heading:* **1. Minimum temperature forecasting.**—*C.E.P.B.*

8C–59 551.509.323:551.524.37(059)

Väderleksgid och Frostbok. Förfarande att förutspå väder långt före de atmosfäriska fenomenen jämte förslag till en ny indelning av tiden, 1955. [Weather and frost forecast, 1955.] Comp. by F. Leiri. Helsinki, Kirjapaino Oy. SANA, **1954.** 35 p. In Finnish and Swedish. List of publications by F. Leiri, (p. 36). **DWB**—Almanac for Helsinki based on 26-day solar calendar with

forecast of weather (temperature, snow, frost, etc.) based on recurrence in correlation with these solar cycles. *Subject Headings:* **1. Almanacs 2. Periodicity forecasts 3. Frost forecasting 4. Helsinki, Finland. I. Leiri, F. (comp.).**—*M.R.*

8C–60 551.509.323:551.509.524

Watanabe, T., **On the local change of air temperature by the advection.** *Journal of Meteorological Research*, Tokyo, 7(8):510–513, Oct. **1955.** 5 figs., 2 tables, 6 refs. In Japanese. **DWB**—A statistical or objective study of air trajectories involved in temperature changes over Japan, using a few simple synoptic models. *Subject Headings:* **1. Objective temperature forecasting 2. Japan.**—*M.R.*

8C–61 551.509.323:551.524.31:551.524.36

Wentik, Francis C., **Diurnal heating chart and its uses.** *U. S. Naval Ordnance Test Station, Inyokern, California, NOTS TM*, No. 1773, May 1, **1954.** 7 p. fig., 36 charts. **DWB**—Rate of temperature rise charts designed as an aid to forecasters at the Naval Ordnance Test Station in predicting maximum temperatures, convective activity, wind and dissipation of stratus. The charts are based on 1950, 1951 and 1952 hourly temperatures segregated according to clear and cloudy days. The charts include 24 semi-monthly curves for clear days and 12 monthly curves for cloudy days. A remarkable feature is a small secondary maximum at midnight or 1:00 a.m. in nearly every month on cloudy days that does not appear at all on the clear day curves. Lowest temperature of day is placed at 0°C on the ordinate. *Subject Headings:* **1. Temperature rise charts 2. Diurnal temperature variations 3. Temperature forecast aids 4. Maximum temperature forecasting 5. Inyokern, Calif.**—*M.R.*

8C–62 551.509.323:551.524.36

Williams, Thomas L., **The use of insolation in forecasting temperatures.** *American Meteorological Society, Bulletin*, 34(6):245–249, June **1953.** 3 figs., 2 tables, refs. **DWB**—Entirely objective forecasts of 1530 MST temperature (close to max. for day) at Las Vegas, Nev., and Phoenix, Ariz., were made from formula and chart based on amount of solar energy available for heating the lower atmosphere after allowance for albedo of clouds, air and ground, and for soil heating. The forecasts showed remarkably good verification even though advection, surface inversions and frontal passages were not considered. For Las Vegas 70% of the forecasts, differed by 2°F or less, and 50% by 1° or less. At Phoenix 80% were within 2°F and 52% within 1°. This was somewhat better than the official forecasts of maximum temperature, both as to extreme rerors and standard deviation of errors. *Subject Headings:* **1. Objective forecasting 2. Maximum temperature forecasting 3. Insolation effects 4. Albedo.**—*M.R.*

8C–63 551.509.323:551.524

Zverev, N. I., **K prognozu temperatury.** [Temperature forecasting.] *Meteorologiia i Gidrologiia*, No. 2:28–29, March/April **1955.** 3 figs., table, 3 eqs. **DLC**—The author examines the role of horizontal turbulence in heat transfer on the assumption that the vertical exchange in the mean troposphere is insignificant. It is shown that in certain instances the equation of heat transfer can be used to forecast temperature changes at the 3000 m level. *Subject Heading:* **1. Temperature forecasting.**—*I.L.D.*

4. WIND

8C–64 551.509.32:681.14:551.55

"Brain" tells weather. *Science News Letter*, 67(17):269, April 23, **1955. DWB**—Experimental results of 30-day long forecasts as computed by an electronic brain are discussed. The idealized mathematical model of atmospheric motion as used by Dr. Norman Phillips (Institute for Advanced Study, Princeton, N. J.) covers an equator-to-pole area only 6000 mi wide about which it is claimed that "there is no doubt that it gives results that are physically real." Electronically computed temperature and pressure changes agreed remarkably with a Weather Bureau forecast 30 days later. Daily wind predictions for U. S. will be electronically computed in the near future. *Subject Headings:* **1. Numerical wind forecasting 2. Electronic computers 3. Forecast verification.**—*W.N.*

8C–65 551.509.32:551.55

Browne, M. L., **Southwesterly winds at Nelson.** *New Zealand. Meteorological Service, Technical Note*, No. 117, Sept. 6, **1954.** 4 p. **DWB**—The main problem in forecasting surface winds at Nelson, when the geostrophic wind is southwesterly, is to determine whether the southwest wind will continue all day or be replaced by a sea breeze. It is shown that, on most occasions, this may be forecast by considering the relative pressures at Hokitika and New Plymouth. Other aspects of forecasting southwest winds are also discussed. *Subject Headings:* **1. Surface wind forecasting 2. Objective wind forecasting 3. Nelson, New Zealand.**—*Author's abstract.*

8C–66 551.509.32:551.55(931)

Browne, M. L., **Surface winds at Paraparaumu Aerodrome.** *New Zealand. Meteorological Office, Technical Note*, No. 85, May 9, 1952. 6 p. **DWB**—Rules are developed for forecasting the incidence of northwest and southeast winds at Paraparaumu Aerodrome, and the behavior of northwest winds at night. Wind changes associated with cold fronts at Paraparaumu are also discussed. *Subject Headings:* **1. Surface wind forecasting 2. Paraparaumu Aerodrome, New Zealand.**—*Author's abstract.*

8C–67 551.509.322.7(02)

§Dickson, Robert R. (*Lt., USNR*), **Aids to jet stream forecasting.** *U. S. Office of Naval Operations, NAVAER*, 50-1P-533, Jan. **1955.** 53 p. 9+ figs., 2 tables, eqs. **DWB**—A manual giving empirical rules and relations between jet stream, tropopause, thermal gradients, wind shear, high level turbulence, etc. for use in analysis, extrapolation and forecasting the winds or turbulence areas at jet stream levels. Many synoptic examples are presented and analyzed. Relation between surface parameters and jet stream, long range forecasting of jet stream, isotach analysis in areas of dense data coverage, and in areas of sparse data, respectively; the thermal wind and applications, etc. are special aspects covered in manual. *Subject Headings:* **1. Jet stream forecasting manual 2. Jet stream analysis.**—*M.R.*

8C–68 551.509.32:551.553.8

§Frank, Hans, **Starke sommerliche Nordwestwinde in den Ostseeausgängen.** [Strong summer NW winds in the Baltic exit.] *Wetterlotse*, No. 52:44–48, Feb. **1953.** 2 figs. **DLC**—Persistent strong NW winds in Skagerrak are associated with a deep secondary over Oslo fjord, and preceded by NW winds aloft. Situation is illustrated by chart for July 20, 1952. Prognostics for its nonoccurrence are also given. *Subject Headings:* **1. Gale forecasting 2. Skagerrak.**—*C.E.P.B.*

8C–69 551.509.32:551.553.21

§Funada, H., **On the outbreak of monsoon.** *Journal of Meteorological Research*, Tokyo, 7(2):95–103, March **1955.** 11 figs., 3 tables. eqs. In Japanese; English summary p. 95. **DWB**—The outbreak of winter monsoon over the Far East is discussed from theoretical and synoptical points of view, and a method of forecasting for its formation is stated. The principal results may be summarized as follows: I) Assuming a homogeneous and incompressible atmosphere, the wind velocity V is given as follows:

$$V = \frac{1}{\rho l}\nabla p + \frac{1}{\rho l^2}\nabla p,$$

where p is the air pressure, ρ the air density, and l the Coriolis parameter. Then the monsoon wind may result from large pressure gradient or large pressure tendency gradient. II) Synoptical situation over the Far East corresponding to the above dynamical condition is the strong development of Siberian High or rapid development of Aleutian Low, and the phenomena are examined, using observational data. III) The law of conservation of absolute vorticity is examined for cold-air outbreak, and the westward recurvature of cold air is explained by the vorticity theory. IV) A notice of northward advection of upper warm air on the east side of cold monsoon is helpful for forecasting of development of monsoon over the Far East. *Subject Headings:* **1. Winter monsoon forecasting 2. Synoptic aerological studies 3. East Asia.**—*Author's abstract.*

8C–70 551.509.32:551.558.21

Harrison, Henry T. (*Dir. Met., United Air Lines*), **Synoptic features of the mountain wave at Denver, Colorado.** *United Air Lines, Inc., Denver, Meteorology Circular*, No. 41, Oct. **1, 1956.** 10 p. 13 figs., 12 refs. **DWB**—A number of aspects of the lee or mountain wave which forms during strong westerly flow over the Rockies, as determined from pilots' reports and synoptic-aerological data and charts for the winter of 1955–56, are treated in systematic fashion, with a view towards aiding the forecaster to recognize or anticipate dangerous turbulence at flying levels on the airlines in the Denver-Cheyenne area. The 13 chapters take up requirements for formation of the mountain wave visible features, turbulence patterns, climatology, observation requirements, 1955–56 sampling at Denver (9 cases of severe wave formation), surface pattern (composite of 9 cases), upper air pattern (700–500–300 mb charts), windspeed profile, jet stream, air mass structure, forecasting hints, etc. Much of the general information is based on the results of the Sierra Wave Project as well as the practical airline experience at Denver or nearby. *Subject Headings:* **1. Mountain wave forecasting 2. Airways meteorology 3. Denver, Colo.**—*M.R.*

8C–71 551.509.32:551.553.21

Hirasawa, K. and Shimada, K., **Forecasting monsoon in winter season at Tokyo.** *Journal of Meteorological Research*, Tokyo, 5(9):730–738, Nov. **1953.** 8 figs., 3 tables. In Japanese; English

summary p. 730. **MH-BH**—An analysis of surface pressure charts in relation to the occurrence of monsoon situations reveals that monsoons prevail when developed cyclones and anticyclones simultaneously appear in certain specified positions, as shown in a chart. Hence the beginning and ending of monsoon situations may be predicted on the basis of cyclones or anticyclones moving into or out of these positions. *Subject Headings:* **1. Monsoon forecasting 2. Japan.**—*G.T.*

8C–72 551.509.32:551.556

§Kozma, Béla and Rajkay, Ödön, **A szélút és szélnyomás előrejelzése.** [Forecasting wind movement and wind pressure.] *Időjárás*, Budapest, 59(3):129–138, May/June **1955.** 7 figs., 2 refs., eqs. Russian and German summaries p. 129. **DWB, DLC**—Formulas for determining wind movement and wind pressure were developed earlier by B. Kozma. In this paper it is shown how those formulas can be used for predicting wind movement and wind pressure from synoptic charts. Three examples of wind forecasting for Budapest (Budaörs) airport from synoptic charts for Western Europe and the Atlantic are given. *Subject Headings:* **1. Wind forecasting 2. Wind pressure 3. Budapest, Hungary.**—*G.T.*

8C–73 551.509.32:551.515.13

§Mertins, —, **EIN Tief = FÜNF Stürme — fünfmal gewarnt.** [One low, five storms, five warnings.] *Wetterlotse*, No. 54:65–74, March **1953.** 4 figs. **DLC**—Jan. 24–28, 1953, fishing fleet off Iceland received gale warnings every day due to rapid developments in a slow-moving low. *Subject Headings:* **1. Gale forecasting 2. Cyclonic activity.**—*C.E.P.B.*

8C–74 551.509.32:551.55

Meyer, R. B. (*U. S. W. B., Forecast Center, L. A., Calif.*), **An objective method for forecasting strong southwest through north winds at Los Angeles Airport.** Wash., D. C., U. S. Weather Bureau, Nov. 1, **1955.** 4 p. 2 figs., 3 tables. **DWB**—An objective chart was prepared for strong westerly or northwesterly winds (31 mph) at Los Angeles Airport, using 1230Z sea level pressure gradient from 35°N, 125°W (320 mi WNW of Los Angeles) to Tonopah, Nev. as one predictor, and 700 mb temperature gradient from Medford, Ore., to Long Beach, Calif. (0300GMT) as the other predictor, and drawing % lines (0, 10, 20, 30, 40, 50 and 60%) to separate the windy days (x) from those with no wind (o). Of the 363 cases, 38 had winds >31 mph, and the 30% line stratified 21 cases for a skill score of .56 (original data), and .68 for 181 cases in Nov.–April 1953–54, or an accuracy of 94%, which is about the same as subjective forecasts would be. *Subject Headings:* **1. Objective wind forecasting 2. Objective forecasting methods 3. Los Angeles Airport, Calif.**—*M.R.*

8C–75 551.509.32:551.555.6:551.515.4(54)

Mull, S.; Gangopadhyaya, M. and George, C. A. (*all, Regional Met. Centre, Calcutta*), **Preview of some upper air analyses in relation to prediction of Nor'westers.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(1):5–30, Jan. **1955.** 12+ figs., 2 tables, 19 refs. **DWB, DLC**—Standard upper air analyses, such as delineation of thermal thickness patterns on isobaric surfaces, computation of "development," vertical component of absolute vorticity of geostrophic winds and horizontal wind velocity convergence were made in relation to the nor'wester thunderstorms over northeast India and East Pakistan. For the thickness analysis, the special Dines's meteorograph observations taken in April 1944 at shorter intervals of time and from a closer network of stations than in 1953 were used, while all the above-mentioned analyses were made for eight *consecutive* days in May 1953. No significant medium-range *prognostic value* was found in any of the analyses based on the available network of radiosonde and upper wind data for forecasting the nor'westers 12 to 36 hrs ahead of their actual occurrence. Nevertheless, the *partial* thickness patterns of the 700/500 mb layer, the field of "development" and the lower level wind velocity convergence, based on the evening data for a particular day, appeared to influence the nor'wester development on the *same evening and night. Subject Headings:* **1. Northwester forecasting 2. Upper air analysis 3. Northeast India 4. East Pakistan.**—*Authors' abstract.*

8C–76 551.509.322.7:656.7

Robinson, Robert, **Pressure flying; pilots yearn for perpetual tail wind; pressure pattern flying helps them get their wish.** *Federal Science Progress*, Wash., D. C., 1(2):36, March **1947.** chart. Price: $.25. **DWB**—Popular account on principles and practical application of a method which accounts for favorable wind direction in determining a flight route through the use of radio and pressure altimeters during the flight, in addition to weather reports received for pre-flight planning. Regular broadcasts of weather reports by the Weather Bureau at 25-min intervals on a radio frequency of 3380 kilocycles, covering a radius of 500 to 800 mi and based on direct reports from pilots while in flight, are to facilitate pressure pattern flying. *Subject Headings:* **1. Pressure pattern flying 2. Flight forecasts 3. Weather broadcasts 4. Pilot reports.**—*G.T.*

8C–77 551.509.5

§Rodewald, Martin, **Warnungen daneben?—Wind daneben.** [Warning missed—wind missed.] *Wetterlotse*, No. 48:210–213, Nov. 1952. 3 figs. Nachtrag by Dr. Mertins, p. 214. **DWB**—Discussion of a warning of strong NE winds in southern N. Sea on Oct. 3, 1952, which was reported a failure though force 8 appeared to N, E and W. *Subject Headings:* **1. Forecast verification 2. North Sea.**—*C.E.P.B.*

8C–78 551.509.322.7:629.13

Rutherford, G. T. (*Central Met. Bureau, Melbourne*), **The accuracy of forecast and found winds.** *Australian Meteorological Magazine, Melbourne*, No. 12:43–60, March 1956. 9 figs., 6 tables, 6 refs., eqs. appendix. **DWB, DLC**—In this paper reference is made to Durst's statistical method (*see* 6.10–102, Oct. 1955, *MAB*) of determining the errors in forecasts, and those in winds found by navigators, with some comparative figures for Australian routes. An expression for the error in the found wind is derived also from the separate errors of time, course, airspeed and position finding, and largely confirms the statistical results. It is concluded that, in general, errors in wind finding by the air plot method are of the same order as the errors in 24 hr forecasts, and, for high speed aircraft over ocean routes, are likely to exceed the forecast errors. Results are given of winds found with our aircraft fitted with distance measuring equipment. *Subject Headings:* **1. Forecast errors 2. Upper air wind forecasting.**—*Author's abstract.*

8C–79 551.509.322.7:629.135.2

U. S. Air Weather Service, **The Black Sheep system of forecasting winds for long-range jet aircraft.** Its *Technical Report*, 105–139, March 1956. 48 p. 45 figs., table. **DWB**—The system described in this manual is based on extrapolation upward to 45,000 ft of the predicted 500 mb flow, for use by B-47 navigators. This involves preparation of a 300 mb 36-hr prognostic chart (below tropopause in most cases) and a supplementary prognostic chart for maximum wind and shear at or near the tropopause. Advective and nonadvective thickness changes in the 300–500 mb layer, anomalous changes, prognostic extrapolation of wind field from 300 to 150 mb, 24 hr changes, adjustments between several charts prepared, jet stream and isoshear prognosis, optimum flight path and optimum cruising altitude, navigation time and other practical aspects are taken up separately and illustrated. Verification data are given in appendix and discussed. Entire operation takes about 3½ hrs. *Subject Headings:* **1. Upper air wind forecasting 2. Jet stream forecasting 3. Project Black Sheep 4. Jet navigation.**—*M.R.*

5. MOISTURE

8C–80 551.509.32:551.578.46

Atwater, Montgomery M. (*U. S. Forest Service, Alta, Utah*), **Relationship of precipitation intensity to avalanche occurrence.** *Western Snow Conference, 20th, Sacramento, Calif., April 1952, Proceedings*, p. 11–19. tables, graphs. **DWB**—Precipitation intensity continuously above 10″ per hour when other conditions are favorable is considered as an important sign of avalanche hazard. A recording device was developed which registers wind force and direction, precipitation and snow fall intensity and even the occurrence of avalanches on different slide paths. Records from a number of storms are interpreted. *Subject Headings:* **1. Avalanche forecasting 2. Snowfall intensity 3. Recording devices 4. Alta, Utah.**—*A.A.*

8C–81 551.509.32:551.578.4 551.508

Blue Hill Meteorological Observatory, **Mt. Washington and Blue Hill data aids to snowstorm forecasting for Boston.** Contract Cwb-8120, 1st and 2nd Quarterly Progress Report, 1949/1950, Feb. 14; March 31, 1950 and 1st, 2nd and 3rd Quarterly Progress Reports, March 29; May 24; Aug. 25, 1951. 5 pieces. figs., tables. **DWB**—In addition to studies aimed at objective forecasting of snowfall at Blue Hill from Mt. Washington, wind and temperature data and weather map typing, studies of pyrheliometer shields (including design, construction and installation), Weston thermometer tests, Foxboro Dewcel tests, under extreme conditions at Mt. Washington, tests of a new heated anemometer, wind vane and direction recorder for Mt. Washington, Stewart precipitation gages and a synoptic and statistical study of the snowstorm of Feb. 21–23, 1950 are included. *Subject Headings:* **1. Snowstorm forecasting 2. Instrument tests 3. Heated anemometers 4. Mt. Washington, Vt. 5. Blue Hill, Mass. I. Brooks, C. F. II. Conrad, V. A. III. Howell, W. E. IV. Conover, J. H.**—*M.R.*

8C–82 551.509.32:551.575.5

Browne, M. L., **Duration of fogs at Harewood.** *New Zealand. Meteorological Office, Technical Note*, No. 95, Dec. 22, 1952. 2 p. **DWB**—Rules for forecasting fog clearence at Harewood are formulated. *Subject Headings:* **1. Fog forecasting 2. Fog duration 3. Harewood, New Zealand.**—*I.L.D.*

8C–83 551.509.32:551.575

§Cabrita, M. T. F., **Análise de algumas situações meteorológicas que originaram nevoeiros em Macau.** [Analysis of some meteorological situations giving rise to fog in Macao.] *Macao. Serviço Meteorológica, Notas Cientificas*, No. 9, **1955.** 29 p. 7 graphs, 4 tables, 5 maps. In Portuguese and in English. **DWB**—The weather and Macao is described in terms of the prevailing air masses over this area and synoptic situations associated with the occurrence of fogs during the period Aug. 1951–July 1955 are discussed. Statistical data on the mean number of fogs 1918–1947, days when fog occurred during the period 1951–1955, etc., are given. Graphs showing the temperature, dew point and pressure and synoptic conditions associated with particular instances of fog are presented. *Subject Headings:* **1. Synoptic conditions for fog 2. Fog data 3. Macao.**—*I.L.D.*

8C–84 551.509.32:551.575.1:551.501.6

Chakravotty, K. C. (*Regional Met. Centre, Calcutta*), **Use of tephigrams in the prediction of radiation fog.** *Indian Journal of Meteorology and Geophysics*, New Delhi, 6(4):327–332, Oct. **1955.** 2 figs., 2 tables, 3 refs. **DWB, DLC**—The author shows "how the radiosonde observations taken at 2030 IST at Calcutta can be used to predict the occurrence of fog during the night or on the following morning with a greater degree of confidence," by a tephigram analysis of 2030 IST radiosonde data along with surface temperature and fog data for Calcutta for the periods 1950–1954. *Subject Headings:* **1. Radiation fog forecasting 2. Tephigrams 3. Calcutta, India.**—*I.L.D.*

8C–85 551.509.52:551.578.4

§*Conover, John H.; Brooks, Charles F. and Conrad, Victor A., **Snowstorm forecasting for Boston** [including] **Manual for objective forecasting of snowstorms at Blue Hill (Boston), Mass. based on data from Mount Washington and Blue Hill for the period 1933/34–1947/48.** Blue Hill Meteorological Observatory, Contract Cwb-8135, Final Report, 1950/1951, Dec. 17, **1951.** (Manual issued Jan. 28, 1952.) 31+70 p. charts, tables, forms, figs., apps. **DWB**—Detailed case studies of storms from synoptic surface and 500 mb maps: winter storms with high pressure north or northeast of Boston, primary low moving into Ohio valley and lower Lake region, secondary forming in the Middle Atlantic region. Table gives characteristic features (duration, precipitation, temperatures, frontal contours, upper winds and temperatures, storm speeds, water temperature, etc.). Forecasting parameters outlined. The manual gives practical forms, shows the probability of snow and rain vs. temperature 6 hrs prior to precipitation, presents numerous forecasting scattergrams for different synoptic situations using temperature and wind indexes at Blue Mill and Mt. Washington. V. Conrad added a review on U. S. Weather Bureau's published methods of objective forecasting (16 papers, 1948–51), presents a catalogue of circulation, moisture and stability variables and discusses each paper in detail. *Subject Headings:* **1. Snow forecasting 2. Objective forecasting 3. Boston, Mass.**—*A.A.*

8C–86 551.509.32:551.574.41:677

Dew forecasting. *World Meteorological Organization, WMO Bulletin*, 3(2):76, April **1954. DWB**—Many articles have been written on physical processes of dew formation, but very few on actual forecasting of dew! This brief note tells of routine forecasts of occurrence or nonoccurrence of dew made at 5 stations in Texas, Tennessee and California. Methods resemble those of frost forecasting (min. temp., dew point, radiation and air-mass as well as micrometeorology of area are considered). Such forecasts are required by cotton producers who use insecticides (which are diluted by dew) so that knowledge of future expectancy of dew or no-dew is valuable. *Subject Headings:* **1. Dew forecasting 2. Cotton production 3. Texas.**—*M.R.*

8C–87 551.509.324:551.578.7

Foster, Donald S. and Bates, Ferdinand C. (*both, SELS Center, U. S. W. B., Kansas City, Mo.*), **A hail size forecasting technique.** *American Meteorological Society, Bulletin*, 37(4):135–141, April **1956.** 6 figs., 3 tables, 7 refs., 9 eqs. **DWB, DLC**—A technique for forecasting the size of hailstones accompanying thunderstorms is presented. Hailstone size is related to its terminal velocity which in turn is related to the updraft velocity of a thunderstorm as derived from parcel buoyancy. This updraft velocity is approximated from positive area measurements on a thermodynamic diagram. The technique is tested on proximity soundings taken near the site and prior to known hail occurrences. (For earlier report, *see* 6.11–161, Nov. 1955, *MAB.*) *Subject Heading:* **1. Hail size forecasting.**—*Authors' abstract.*

8C–88 551.509.32:551.578.46

Friedrich, W., **Synoptische Lawinenprognosen.** [Synoptic avalanche forecasting.] *Wetter und Leben*, 5(1/2):9–11, March **1953. DLC**—The forecasting of avalanches depends upon a knowledge of the causes of avalanches involving a knowledge of 1) slipping readiness, amount of snow,

ice and snow characteristics; 2) weather situation associated with avalanches and 3) observation of snow conditions during the entire winter and early spring. *Subject Headings:* **1. Avalanche forecasting 2. Avalanches 3. Snow characteristics.**—*I.L.D.*

8C–89 551.509.32:551.576

Gogoleva, E. I., **Ispol'zovanie kart vlazhnosti dlia prognoza nizkoĭ oblachnosti.** [Use of humidity charts for forecasting low clouds.] *Meteorologiia i Gidrologiia,* No. 7:8–13, July **1956.** 4 figs., 2 refs. **DWB, DLC**—In order to clarify the role of the humidity field tendency in the formation of low clouds, the author constructed special charts of 12-hr variation in the sign of the dew point; these charts resemble charts of specific humidity variations, namely isalogram charts. The values $\pm\Delta T_d$ (T_d—the dew point in the region from where the air flows) between two 12-hr periods are plotted on a surface system map. The zero isoline separating the plus and minus regions is determined. In the isogram analysis the center of maximum and minimum values of ΔT_d are determined: also the isolines $T-T_d=1°$ are determined so that one can distinguish regions with saturated air from unsaturated air. The possible formation of low clouds can be determined by extrapolating the zero of positive change of the dewpoint and the boundaries of saturation in the direction of movement. The condition of similar charts for the upper level and their use in specific forecasting cases are illustrated. *Subject Heading:* **1. Forecasting low clouds.**—*I.L.D.*

8C–90 551.509.32:551.576

Graham, Roderick D., **An objective method for forecasting stratus arrival time at Los Angeles International Airport.** U. S. Weather Bureau, Jan. **1952.** 3 pages. 6 figs., 3 tables. Photostat of typescript. **DWB**—Objective aids to forecasting onset of ceilings <5000 ft between 1230 and 0630 at Los Angeles Int. Airport, include histograms, nomograms, graphs and tables to use in connection with 1) frequency of arrival time in different months, May–Sept., 1947–1951, 2) pressure difference, Los Angeles-Bakersfield, 3) magnitude of inversion, (thickness 850–700 mb at Santa Maria), and 4) verification for 10 months of independent data and official aviation forecast score. The two forecasts were about the same with respect to skill. Further stratification of cases was according to two types of reports from Catalina Island (surface fog, haze or stratus, and temperature or dew point at that station). *Subject Headings:* **1. Objective stratus forecasting 2. Stratus forecasting 3. Los Angeles, Calif.**—*M.R.*

8C–91 551.509.32:551.575.1:551.576.12

†Graves, Maurice E., **Summary of research at Limatambo, Peru, 1939–1954.** Limatambo, Peru, Pan American-Grace Airways, Inc., Jan. 2, **1954.** 26 p. 6 figs., map, tables, 42+15 refs. **DWB**—Four types of research into the stratus or fog problem along the Peruvian Coast are reviewed: 1) physical, 2) statistical, 3) synoptic and 4) thermodynamic. Within each type the studies are reviewed chronologically. In all, 42 local fog or stratus studies are listed, and 15 wind aloft studies in supplement. A station location-topographic chart of Peru and Chile, and a number of scatter diagrams, adiabatic and climatological graphs (but no synoptic charts) are included as examples. *Subject Headings:* **1. Local forecast studies 2. Fog and stratus research 3. Objective fog forecasting 4. Literature surveys 5. Limatambo, Peru 6. Peruvian coast.**—*M.R.*

8C–92 551.509.32:551.575.5

*Hilworth, J. T., **Advection fog and stratus at New Orleans, Moisant Airport.** Eastern Air Lines, Inc., Meteorology Dept., Sept. **1953.** 24 p. 17 figs., tables. Mimeo. **DWB**—The author presents an objective method for short range forecasting of the occurrence or nonoccurrence of advection fog or stratus, "above or below ceiling 200 ft and/or visibility ½ mi," "time of formation and time below ceiling 200 ft and/or visibility ½ mi," and "time above ceiling 200 ft and/or below visibility ½ mi." This study is based upon a seven year record of fog and stratus cases, a catalog of which is given in the appendix, and it includes all dates where air arriving at New Orleans after sunset had traveled over water during the daylight hours. The forecasting procedures for each season are given and illustrated. *Subject Headings:* **1. Fog forecasting 2. Advection fog 3. Objective forecasting 4. New Orleans, La.**—*I.L.D.*

8C–93 551.509.32:551.575.1

Hoover, Robert A. (*W. B. A. S., Wash., D. C.*), **Forecasting advection stratus at Washington, D. C. during August and September.** Wash., D. C., U. S. Weather Bureau, July 15, **1953.** 4 p. 4 figs., 2 refs. **DWB**—An objective study of advection stratus formation at Washington National Airport during Aug. and Sept. shows that marine air with a long overwater trajectory (from NE) when subjected to radiation, at night, gives the greatest likelihood of low stratus or fog. Thus it is a combination of advection and radiation fog. Pure advection fog rarely penetrates or persists as far inland as Washington. The objective parameters used are: (1) position of 1930 E surface high and (2) temperature and dew point upstream along coast. Data for 1944–50 were used for analysis

and 1951 for test purposes. Nights when precipitation or fronts occurred were not included. Verification occurred, if scattered, to overcast <2100 ft at Washington at any hour from sunset to 2 hours after sunrise. *Subject Headings:* **1. Advection fog 2. Stratus forecasting 3. Washington National Airport, Washington, D. C.**—*M.R.*

8C–94 551.509.32:551.578.4

Hukuhara, Kozo, **Study of the forecasting of snowfall. Reports 1-2.** *Seppyo (Snow and Ice)*, Tokyo, 12(6):195–211, 1951. diagrs., table. In Japanese. **DWB**—Taking into consideration the orographic effects of the Hokuriku District, the author described an objective synoptic-aerological method of forecasting the commencement, the duration, and the amount of snowfall, quantitatively. *Subject Headings:* **1. Snowfall forecasting 2. Objective forecasting 3. Hokuriku District, Japan.**—*H. Arakawa.*

8C–95 551.509.32:551.515.8:551.578.43

Ishihara, Kenji, **On the forecasting for heavy snow in Hokuriku.** *Seppyo (Snow and Ice)*, Tokyo, 12(1):181–187, 1950. figs., tables. In Japanese. **DWB**—The mechanism of heavy snowfall was studied by the collection of heavy snowfall data (depth increases of snow cover about 25 cm per day). The chief cause was attributed to a local secondary front among modified polar continental air masses. Synoptic case studies are also given. *Subject Headings:* **1. Snowfall forecasting 2. Excessive snowfall 3. Frontal effects 4. Hokuriku District, Japan.**—*H. Arakawa.*

8C–96 551.509.32:551.578.46

§Ito, Hiroshi, **On the forecast of snow accretion.** *Researches on Snow and Ice*, Tokyo, No. 1:81–85, Oct. **1953.** 4 figs., 2 tables. In Japanese. **DWB**—Synoptic-aerological and statistical approach, with diagrams and charts presented. *Subject Headings:* **1. Snow accumulation forecasting 2. Synoptic aerological studies.**—*M.R.*

8C–97 551.509.32:551.575

Jacobson, Arthur L. (*WBAS, Great Falls, Mont.*), **Radiational and upslope fog at Billings Airport.** Wash., D. C., U. S. Weather Bureau, June 15, **1954.** 4 p. 3 figs., ref. **DWB**—Thirty cases of fog (visibility $<\frac{1}{2}$ mi) at Billings, Mont. Airport (located on a 400 ft high bench with the rimrock to the south and gentle slope downward to the NE) between 1945 and 1949 are analyzed to provide empirical rules for future forecasts. Precipitation occurred on the same or previous day on 26 out of these 30 cases and on 7 out of 9 cases in the test period 1950–1951. Warm fronts to the west accounted for some of the failures. At least half of the 30 cases showed warm or stationary fronts directly west of Billings. Only warm front or post cold frontal fog with strong north winds persisted for over an hour. No fog should be forecast with winds from southerly direction >10 mph. Upslope fog is frequent and widespread with N to NE winds. *Subject Headings:* **1. Fog forecasting rules 2. Objective fog forecasting 3. Billings Airport, Mont.**—*M.R.*

8C–98 551.509.32(521.43):551.578.46

Kikuchi, T., **On the forecasting of snow depth at Ishikawa Prefecture.** *Journal of Meteorological Research*, Tokyo, 7(2):92–94, March **1955.** 3 figs. In Japanese; English summary p. 92. **DWB**—The author obtained two statistical relations for forecasting of snow depth in Ishikawa Prefecture. That is: 1) $S=0.15R\,(5.5-t)$, 2) $S=0.0096R\,(9.2-t)^2$, where S (cm) is the accumulated amount of fresh snow depth, and R (mm) and t°C the total amount of precipitation and the mean temperature, for the period from Jan. 1 to Feb. 28, respectively. And then, a nomogram for calculating the value of S from the above formulas is prepared. *Subject Headings:* **1. Snow forecasting 2. Snow depth 3. Ishikawa Prefecture, Japan.**—*Author's abstract.*

8C–99 551.509.32:551.575.1

Kingham, H. H., **Forecasting of radiation fog at Wigram.** *New Zealand. Meteorological Service, Technical Note*, No. 122, June 15, **1955.** 3 p. 3 figs. **DWB**—An attempt has been made to forecast radiation fog at Wigram, making use of graphs prepared on past statistics of wind, dew point depression and diurnal variation of temperature. While some success has been obtained by an objective application of the graphs, a much more comprehensive forecast may be made by attempting to forecast one or more of the three elements used in the method. *Subject Headings:* **1. Radiation fog forecasting 2. Wigram, New Zealand.**—*Author's abstract.*

8C–100 551.509.32:551.575.1

Koshelenko, I. V., **O prognoze radiatsionnogo tumana.** [Forecasting radiational fog.] *Meteorologiia i Gidrologiia*, Leningrad, No. 3:28–32, March **1956.** 4 figs., 2 tables, 2 refs. **DWB, DLC**—The defects in A. S. Zverev's graphical method of forecasting radiational fog are pointed out, in particular the error resulting from underestimating the drop in relation to humidity. The use

of the emagram for forecasting radiational fog is proposed and its use for determining temperature and the correction for calculating the drop in nocturnal relative humidity is described. Tables giving corrections for dew points for various temperatures and wind velocities for the Moscow district and corrections for the mean water content of fog are given and the daily variation of the dewpoint as a function of the saturation of the atmosphere and the variation of the nocturnal dewpoint with the vertical gradient of the dewpoint, etc. are discussed. And an example illustrating the use of this method for forecasting radiation fog at Moscow is presented. *Subject Headings:* **1. Radiation fog forecasting 2. Moscow, U.S.S.R.**—*I.L.D.*

8C–101 551.509.32:551.575

Lee, R., **Fog forecasting.** *Canada. Meteorological Div., Cir.* 2725, Tec. 226; *Short Range Forecast Techniques*, No. 5, Dec. 6, **1955.** 12 p. fig., 9 refs., eqs. **DWB**—A brief summary of processes of fog formation and dissipation, description of properties of 6 different fog types and methods recommended for forecasting time of formation of frontal, sea and upslope fog, and an adaptation of W. C. JACOBS minimum temperature forecasting diagram (*A. M. S., Bul.*, 21:297–301, **1940**) to forecasting radiation fog; methods of forecasting time of dissipation (Wood's relation between thickness and time, and extrapolation of temperature variation curve). JACOBS' nomogram for calculating radiative temperature from BRUNT's formula is reproduced and its use is explained in detail and examples given. *Subject Headings:* **1. Fog forecasting 2. Jacob's radiation temperature diagram 3. Brunt's formula.**—*M.R.*

8C–102 551.509.32:551.575

Lee, R., **Stratus forecasting.** *Canada. Meteorological Div., Cir*-2677; *Short Range Forecast Techniques*, No. 4, July 7, **1955.** 12 p. fig., table, 11 refs. **DWB**—Discusses and reviews processes of fog formation and dissipation, stratus types and the associated forecast problems, methods for forecasting time of formation (Goldman's method, variation of dew point depression graph, and forecasting time of a critical wind direction change), methods of forecasting time of dissipation (empirical relation between thickness and time of dissipation worked out by F. B. WOOD), and G. J. JEFFERSON's method using solar radiation data for England. Application is made to Canadian conditions. *Subject Headings:* **1. Fog forecasting methods 2. Fog formation 3. Canada.**—*M.R.*

8C–103 551.509.32:551.576.12

Lindquist, Harold Douglas (*W. B. A. S., Seattle, Wash.*), **Some factors related to the time of dissipation of fog or stratus at Seattle.** U. S. Weather Bureau, Feb. **1956.** 9 p. 5 charts, 4 refs. **DWB**—In his 1953 study (*see* 5.4–67, April 1954, *MAB*) LINDQUIST found pressure gradients, wind direction and dew point the most important factors in determining formation of stratus in the Puget Sound area in summer. The present study, using data for July and Aug. 1949–55, shows that wind speed or direction have little relation to time of dissipation of stratus or advection fog at the Seattle-Tacoma airport, but that a strong northerly wind favored early dissipation. Pibal data from Sand Point (1954–55) and Seattle Airport (1949–53) showed that 2000 ft winds during stratus are usually northerly, and clearing occurs earlier during stronger winds, especially from NE. Pressure gradient from Hoquiam-Ellensburg, solar radiation at Seattle (in langleys) at 7 a.m., and thickness of fog are also useful parameters. *Subject Headings:* **1. Stratus forecasting 2. Objective fog forecasting 3. Fire weather forecasting 4. Seattle, Wash.**—*M.R.*

8C–104 551.509.32:551.575.

*Lloyd, Merle G. (*W. B. A. S., Anchorage, Alaska*), **Objective method for forecasting radiation fog at Salt Lake City Airport, Utah.** Feb. 11, **1955.** 8 p. 8 tables, 7 figs., 15 refs. **DWB**—Tabulation of hours with fog at Salt Lake City, Utah, shows all cases during Nov.–March and greatest frequency in Dec. Temperatures at times of fog are more often near freezing; 73% from 23°–36°F and 80% of all radiation fog lie in that range. 1430 h temperature versus dew point depression (for the previous afternoon) gives good stratification. Visibility was found to be a significant parameter = in 87% of cases of fog, smoke reduced visibility the previous afternoon. Wind between SW and N was found on 86% of days with fog (shifting to SE at night). Time of fog formation was also worked out objectively. Methods were tested against independent data (1951–1953) and results compared with subjective methods and found to be as good. *Subject Headings:* **1. Objective fog forecasting 2. Radiation fog forecasting 3. Salt Lake City, Utah.**—*M.R.*

8C–105 551.509.32:551.573:519.249

*Romita, Pier Luigi, **Contributo alla previsione dell'evaporazione dalle grandi superfici liquide.** [Contribution to the forecasting of evaporation from a large liquid surface.] *Milan. Politecnico Istituto di Idraulica e Costruzioni Idrauliche, Memorie e Studi*, No. 109, **1943.** 12 p. 2 figs., 4 tables, 11 refs., eqs. **DWB**—Monthly mean evaporation data from 23 stations on natural or artificial lakes in the U. S. and Puerto Rico are tabulated along with temperature and coefficient of evaporation

Ci and *Ai* data. The various results are plotted on graphs by months according to wind velocity and relative humidity. Calculations were made by using the formula of CONTI (1924) and of M. VISENTINI (1938). The CONTI formula is written $E = Cit_s \frac{P}{Pn}$ ($i = 1, 2 \ldots 12$) where E is mean monthly evaporation, t_s is vapor pressure corresponding to mean monthly temperature, P is mean monthly pressure, and Pn normal pressure and C a coefficient that varies from month to month. VISENTINI's formula is $E = aT^{1.5}$ where T is mean monthly temperature and A a constant coefficient (from month to month). The author has adapted this latter formula by introducing Pn/P and calling the index Ai where i varies from month to month (1, 2, . . . 12). The Ci index shows a sloping regression line for all months when plotted against wind speed. The Ai coefficient slopes in winter months but is constant (with some scatter) in May–Oct. The poor correlation in winter is due to freezing temperatures. *Subject Headings:* **1. Evaporation from lakes 2. Evaporation coefficient 3. Evaporation forecasting. I. Conti, L. II. Visentini, M.**—*M.R.*

8C–106 551.509.32:551.578.46

Seki, K., **On the forecasting of avalanche in Hokuriku District, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 7(11):751–753, Dec. **1955.** 6 figs., 3 tables. In Japanese. **DWB, DLC**—A mathematical study of weather and avalanches in the Hokuriku District of Japan. *Subject Headings:* **1. Avalanche forecasting 2. Hokuriku District, Japan.**—*M.R.*

8C–107 551.509.32:551.578.43

Soderberg, Marshall E., **Study of the influence of Lake Michigan on snowfall at Muskegon, Michigan.** U. S. Weather Bureau, **1954?** 1 p. 4 graphs. Typescript. **DWB**—All cases of snowfall at Muskegon when winds were off the Lake (SW–NNW) during Nov.–Feb. for winters from 1949–50 to 1952–53, were analyzed using only that snowfall which came after the wind shift or cold front passage (cP air mass). A chart is shown for each month outlining in black, red and blue ink the area which encompasses all cases of measurable snow, 2–4″ of snow, and >4″ of snow, respectively, with water temperature as ordinate and minimum temperature as abscissa. For forecasting, the minimum temperature must be predicted and the water temperature obtained from the pumping station intake out in the lake. *Subject Headings:* **1. Snowfall forecasting 2. Objective snow forecasts 3. Lake influences 4. Muskegon, Mich.**—*M.R.*

8C–108 551.509.32:551.578.43(521.28)

§Udagawa, K., **Some characters of snowfall under the prevailing north-westerly monsoon in Southern Kanto.** *Journal of Meteorological Research*, Tokyo, 7(8):514–519, Oct. **1955.** 12 figs., 3 tables, 2 refs. In Japanese. **DWB**—A statistical-climatological-aerological and synoptic forecast study of snow situations over Southern Kwanto District of Japan based on data for 1931–1945. Upper air soundings and crossections as well as synoptic charts and models of processes involved in snowfall during NW flow of various types are included. *Subject Headings:* **1. Synoptic climatology 2. Snowfall forecasting 3. Local forecast studies 4. Kwanto District, Japan.**—*M.R.*

8C–109 551.509.32:551.578.45(521.14)

Umeda, S., **On the heavy snowfall in Akita Prefecture.** *Journal of Meteorological Research*, Tokyo, 5(6):455–464, July **1953.** 5 figs., 3 tables, 10 refs. In Japanese; English summary p. 455. **DWB**—Snow fall forecasting for the Japan Sea side has been studied by many authors. In relation to forecasting heavy snowfall in Akita Prefecture, the author investigated statistically the occurrence of heavy snowfall and tested a forecasting method using the 1000–850 mb thickness, the vertical stability of air mass and the air mass sources. The results obtained are not satisfactory but the problems to be studied in the future have been made clear. *Subject Headings:* **1. Snowfall forecasting 2. Akita, Prefecture, Japan.**—*Author's abstract.*

8C–110 551.509.32:551.576.1:629.135.2

*U. S. Air Weather Service, **Analysis of some contrail data.** Its *AWS Technical Report*, 105-103, Feb. **1953.** 13 p. fig., 4 tables, 2 refs. **DWB**—Contrail data obtained from B-36 and B-47 jet aircraft operation in the U. S., and F-84 and F-86 in Europe, during April–Oct. at 10,000 ft to >40,000 ft are analyzed to check validity of forecast procedures outlined in AWS Manual 105-100 published in April 1952. Data are stratified into 9 areas on Skew T log p Diagram AWS WPC 9-16 for pressures from 500 mb up, and temperatures −10° to −70°C. The data confirm in general the forecast criteria set forth in the manual for levels above 350 mb; type of tropopause as well as humidity data is useful. The curves can be modified to use for forecasting contrails from piston aircraft. Near the critical temperature there is some difference between types of jets as to incidence of contrail formation. *Subject Headings:* **1. Condensation trail forecasting 2. Condensation trail data analysis 3. Condensation trail-tropopause relationships.**—*M.R.*

8C–111 551.509.32:551.576.1:629.135.2

*U. S. Air Weather Service, **Estimate of the contrail problem.** Its *AWS Technical Report*, 105-104, Feb. 1, **1953.** 26 p. 6 tables, charts, 4 refs. **DWB**—Using criteria established for contrail formation at critical temperature intervals with varying humidity (0 to 100%), charts of the Northern Hemisphere were prepared and are presented for Jan.–April and July–Oct. for each of the three levels: 10, 13 and 16 km, and showing areas of >97%, 75–97%, 25–75%, 3–25% and <3% probability of contrail formation, and mean location of tropopause at that season (taken from FLOHN's charts). Data used for critical temperature in various latitude belts are taken from B. RATNER's **Temperature frequency in upper air** and Northern Hemisphere Normal Weather Maps (U. S. W. B., 1946). Critical temperatures for troposphere are given separately from those for the stratosphere. *Subject Headings:* **1. Condensation trail probability data 2. Northern Hemisphere charts 3. Northern Hemisphere. I. Flohn, H. II. Ratner, B.**—*M.R.*

8C–112 551.509.32:551.575.5

*U. S. Air Weather Service, **Forecasting fog in the Brahmaputra Valley.** *U. S. Air Weather Service, Technical Report*, No. 105–73, March **1951.** 17 p. 2 figs., tables. Photostat. **DWB**—Objective techniques have been worked out for short range forecasting of radiation fog in the Brahmaputra Valley. The radiosonde data (potential temperature of convective cloud level) are supplemented by calculations of the moisture and temperature conditions at the convective condensation level (cloud base) in the afternoon, which gives some indication of the changes that have occurred since the morning Raob on account of cooling of air below clouds or moisture added through rain or showers or changes due to surface evaporation, advection, fronts, etc. Climatic records dating back 50 years are available for 9 stations and have been summarized as an aid to forecasting. Hourly frequencies and durations of fog (in hours) are tabulated for each month in fog season (Oct.–March). A number of practical rules for forecasting are given as well as the objective aid. *Subject Headings:* **1. Fog frequency data 2. Fog forecasting 3. Objective forecasting 4. Brahmaputra Valley, India.** —*M.R.*

8C–113 551.509.324:551.578.7

*§U. S. Air Weather Service. Severe Weather Warning Center, Tinker Air Force Base, Oklahoma City, **Air structure near areas of extensive hail damage.** *American Meteorological Society, Bulletin*, 36(9):475–481, Nov. **1955.** 11 figs., 3 tables, 2 refs. **DWB, DLC**—A correlation of synoptic features and upper level flow patterns with 16 crop-hail insurance claim areas in the mid-western U. S. is made. This study indicates that the following two parameters are present in each case, and may play a significant role in the establishment of an air mass structure which sustains widespread hail activity: (a) A 30–40 kn band of maximum wind flow at 16,000 ft through, or just north of, the hail area. (b) A closed anticyclonic circulation extending from the gradient level up to the 8000–10,000 ft level, and occasionally higher. *Subject Headings:* **1. Synoptic conditions for hailstorms 2. Synoptic analysis 3. Hailstorms 4. Midwest, United States.**—*Author's abstract.*

8C–114 551.509.32:551.578.45(521.16)

Yamashita, Y. and Kasugai, T., **Forecast of the heavy snowfall by monsoon in Fukushima Prefecture, (Researches in the weather forecast in Fukushima Prefecture under the monsoon in winter, Pt. 2).** *Journal of Meteorological Research*, Tokyo, 7(9):540–552, Oct. **1955.** 18 figs., 9 tables, 11 refs. In Japanese; English summary p. 540. **DWB, DLC.** Also issued as: *Sendai, Japan. Central Meteorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, 9(1):18–30, Nov. **1955.** In Japanese; English summary p. 18.—Several meteorological factors which are supposed to contribute to the occurrence of heavy snowfall by monsoons in Fukushima Prefecture are examined, and a quasi-objective method of forecasting the heavy snowfalls is presented. Results are as follows: (1) On the surface weather maps it is recognized that the occurrence of heavy snowfall is related chiefly to the general direction of isobars and not so much to the pressure gradient. The larger the vertical instability, the larger the probability of heavy snowfall occurrence is but when the horizontal instability is too large, a heavy snowfall seems rather not to occur. (2) For the same amount of water vapor at 850-mb height, a large convective instability is likely to lead to a heavy snowfall. The necessary condition of heavy snowfall is that a trough of 300 mb exists in front of or closely near the mainland (Honshu) and its neighborhood. (3) The snowfall amount depends largely on the pressure gradient, the general direction of isobars and the instability, and the amount of precipitable water does not play an important rôle. (4) The distribution of snowfall amount seems to be characterized by the pressure gradient and the instability. By combining these results, the authors made objective formulae for predicting the possibility of occurrence of heavy snowfall caused by monsoons (Appendix). The greater part of these formulae were fitted (or unfit) to the forecast of heavy snowfall occurrence, and the rate of coming-true of the forecasts of heavy (or too light) snowfall was 86%. This result would be improved, if forecasters should execute other detailed analyses, etc. *Subject Headings:* **1. Snowstorm forecasting 2. Fukushima Prefecture, Japan.**—*Authors' abstract.*

6. APPLICATIONS

8C–115 551.509.58:551.571.3

*Allyn, William J. (*U. S. W. B. Airport Station, Seattle-Tacoma Airport*), **Objective aids for forecasting minimum relative humidity at Wind River, Gifford Pinchot National Forest.** [U. S. Weather Bureau,] May 28, **1953.** 8 p. 5 charts, 9 refs. **DWB**—Verification of minimum humidity forecasts for 37 stations in the Washington fire weather district showed that poorest scores were made at 3 stations near the Columbia River Gorge. Of these, Wind River was chosen for further study because of the long and consistent climatic record available for that station (*see* 4.10-229, Oct. 1953, *MAB*). The location in the Gorge through the Cascade Mountains results in a dual climate—with strong westerlies, a marine climate prevails while with easterlies a continental climate results! Over 50% of humidity forecast failures were due to great and sudden changes in the usually conservative dew point temperature. Such changes do not occur as abruptly or as often in western or eastern Washington. Several parameters were tested statistically, using 3 years of data (1950–52) and a list of both objective and subjective rules for forecasting dew point changes and maximum temperatures set forth. These should be applicable to the entire Columbia Gorge area and give 66% accuracy to ±7%. (*See also* 4.7–53, July 1953, *MAB*.) *Subject Headings:* **1. Fire weather forecasting 2. Objective forecasting 3. Relative humidity forecasting 4. Wind River, Wash.**—*M.R.*

8C–116 551.509.58:632.9:633.491

§*Bourke, P. M. Austin, **Potato blight and the weather in Ireland in 1953.** *Eire. Meteorological Service, Technical Note*, No. 15, Oct. **1953.** 23 p. 56 charts, tables, 11 refs. **DWB**—Two previous papers describing the Potato Blight Radio Warning Service in Ireland and its operation in 1952 have been abstracted (*see items* 5.5–70 and 5.5–155, May 1954, *MAB*.). The present paper gives details of the operation of the service in 1953, including a list of observation stations, progress of the blight during the year and the occurrences of blight weather, warnings issued and success of such warnings. The blight appeared late in the summer of 1953, made quiet progress in late July and by mid-Aug. was widespread in the Midlands. Surface synoptic charts corresponding to some of the main occurrences of blight and statistical diagrams, charts, etc. are appended. *Subject Headings:* **1. Potato blight warning service 2. Ireland.**—*M.R.*

8C–117 551.509.5:632.9:633.491

Bourke, P. M. Austin (*Irish Met. Service*), **Weather and potato blight in Chile.** *World Meteorological Organization, WMO Bulletin*, 6(1):36–38, Jan. 1957. **DWB**—The seriousness of the potato blight epidemic which hit Chile for the first time in 1950, is brought out in this article by Bourke, who was assigned as a Technical Assistance Advisor for a year (having had experience in potato blight forecasting in Ireland). The world wide nature of the disease, counter measures (resistant varieties and fungicides), aid from the meteorologist in forecasting for spraying at the optimum time, and in research programs as to where testing resistant varieties or seed potato production would be most favorable and, finally, results of blight weather studies in Chile for 1951–56 and agrometeorological station program are mentioned. *Subject Headings:* **1. Potato blight forecasting 2. Chile.**—*M.R.*

8C–118 551.509.58:523.78

*Brooks, Edward M. (*Inst. of Tech., St. Louis Univ.*), **The weather outlook for this year's eclipse.** *Weatherwise*, 7(2):32–33, 40, April **1954.** fig. Spanish translation, Roldan Seminario, Ernesto, **Las perspectivas meteorológicas para el eclipse de este año.** *Revista Meteorológica del Peru*, Lima, 1(1):52–54, Dec. **1954. DWB**—A table, prepared from daily weather maps for 5 June's (1949–1953) and 6 July's (1948–1953) show chance that eclipse will be visible at each of 7 station along or near the path of totality, and the chance for no clouds, fog or haze at each. For instance, at Spencer, Iowa, the sun will be only 3° above the horizon, the chance of seeing it will be 40% and the chance of ideal conditions 18%. Conditions get worse progressively as one goes toward Hudson Bay (Moosonee, Ont., 29% and 9%) for conditions favorable for visual or for instrumental observations, respectively; at Minneapolis the frequencies are 47% and 12%, respectively. *Subject Headings:* **1. Eclipse weather probabilities 2. Solar eclipse, June 1954 3. Great Lakes States.**—*M.R.*

8C–119 551.509.58:629.13

Canada. Meteorological Division, **Weather service to jet aircraft operations.** Its *CIR*-2352, AIR-108, Aug. 27, 1953. 2 p. **DWB**—The forthcoming rapid expansion of jet aircraft operations and the fact that jet planes are provided with a limited amount of fuel which prevents them from making big changes in their course, especially after having approached their destination, calls attention to importance of accurate and up-to-date terminal and amended weather forecasts which require rapid dissemination of weather information based on an accurate knowledge of winds, tem-

peratures, turbulences and high clouds and in particular the base, tops and amounts of all clou above 20,000 ft. *Subject Headings:* **1. Forecasting for jet aircraft 2. Forecast accuracy.**—*A.M.I*

8C–120 551.509.312:629.1

Farlowe, Junius et al., **Progress report on forecasting wedge formation in the Atlanta, Georg area.** U. S. Weather Bureau, **1953?** 6 p. 2 figs., chart. Typescript. **DWB**—Wedges of hig pressure over the Piedmont (southern Appalachian Mts.) occur only 19% of all days in wint (1947–52) but are responsible for 63% of all ceilings <300 ft. They are one of the toughest foreca problems in the Atlanta District. Composite charts of 850 mb pressure and temperature ov United States for (a) 5 wedge cases and (b) 5 nonwedge cases, show the essential difference in upp air circulation and temperature. Similar charts were prepared for 700 mb level and for 850 and 7 mb level for 24 hrs prior and later, but no real differences were evident. The most successful of a objective parameters tested was the height-difference between Nashville and Oklahoma City, ar the temperature difference between Columbia, Mo. and Lake Charles, La. A scatter diagram show the validity of these parameters. *Subject Headings:* **1. Forecasting coastal wedges 2. Aviatio forecasts 3. Objective forecasting 4. Southeastern United States.**—*M.R.*

8C–121 551.509.58:656

Fritz, L. G. (*American Airlines, Inc.*), **The airline meteorologist.** *Weatherwise*, 6(2):40–4 April **1953.** illus. **DWB**—General remarks on development of meteorological service to airline both by the government and by industrial meteorologists working directly with the airlines dispat personnel and the pilots. The airlines meteorologist performs a function which cannot be performe by a consolidated forecast briefing center. *Subject Heading:* **1. Airlines meteorological service** —*M.R.*

8C–122 551.509.58:632.18

Hanna, Ralph, T., **Evaluation of fire seasons for Klamath National Forest.** Copy of a lett dated Oct. 16, **1952,** signed by WFWC, addressed to Fire Despatcher, Klamath National Fores 3 p. 2 charts, table. Typescript. **DWB**—In an attempt to evaluate past fire seasons and t forecast the coming fire danger by July (for the July–Sept. fire season), the author took 49 years precipitation record (1903–1951) for 5 stations in Klamath National Forest of Calif. and calculate normals and % of normal of each year for the period of Jan.–June; for June and for July–Sep Charts were prepared correlating June precipitation (% of normal) with Jan.–June and with th fire danger rating (for the last 9 years, only). This showed that in only one case out of nine th rating was out of line with the hypothesis that dry winter and spring, combined with a dry Jun gives great subsequent danger and vice versa. Similar comparisons were made using winter, Jun and summer precipitation and fire severity rating, with similar results, data were too few to appl tests of significance. *Subject Headings:* **1. Precipitation effects 2. Fire weather forecasting 3. Fi danger rating 4. Klamath Forest, Calif.**—*M.R.*

8C–123 551.509.5:633.4

Hara, Saburo (*Kanagawa Agric. Statistics and Survey Off.*), **On the early estimation of the yie of sweet potatoes—based on the experiments of the meteorological influences on sweet potatoes the early-grubbing region.** *Journal of Agricultural Meteorology*, Tokyo, 9(3/4):91–95, Aug. 195 3 figs., 2 tables. In Japanese; English summary p. 95. **MH-BH**—In order to establish the metho of early estimation of the yield of sweet potatoes, the author analyzed the results of the experimen of meteorological influences, which were carried out at Ono Town, Nakagun, Kanagawa Prefectu from 1948 to 1952. 1) The crop of sweet potatoes increases with high temperature from May t July and in Sept., and by much rain in Aug. 2) Analyzing the process of growth in each mont and examining M and V among 10 meteorological elements in each period, the fact is found that th order of good time for yield estimation is June, July, May, Sept., Oct. and Aug. 3) By the orde the most important meteorological element in each process of growth can be made clear. 4) Th difference of the coefficient of correlation of each meteorological element to yield between adjoinin months is the greatest in July and Aug., little in May and June, and in June and July. 5) To estima the yield July 15–April 1 is the best. All through the process of growth the correlation of bot length and weights of the stem was found to be very good. 6) We can further confirm above resul by the method of analysis of variance. Then we formed 19 expressions for estimating yield based o these facts and compared the estimated value with the observed value. *Subject Headings:* **1. Cro yield forecasting 2. Sweet potatoes 3. Kanagawa Prefecture, Japan.**—*From author's abstract.*

8C–124 551.509.59:633.1

Hentschel, G., **Phänologisch-singuläre Prognostik der Winterroggenblüte.** [Forecastin flowering of winter rye by phenological singularities.] *Angewandte Meteorologie*, 1(10):314–31 June **1953.** 4 figs., 8 refs. **DLC**—Winter rye in Germany flowers between May 18 and June 1

The date has no relation to flowering dates of several late-winter and early spring plants so that it must depend only on weather after early spring. Years 1858–1884 are classified into 3 types by overlapping 5-day temperatures March 22–May 1 and it is found that type of variation gives a forecast of the rye flowering. *Subject Headings:* **1. Agrometeorological forecasting 2. Rye.**—*C.E.P.B.*

8C–125 551.509.59:63

Hornstein, R. A., **Experimental long-range forecasts, Halifax Dominion Public Weather Office. Canada.** *Meteorological Div., Cir.* 2129, Pub. 168, June 25, **1952.** 14 p. ref. **DWB**—Report on 3–6-day forecasts made during the summer of 1950 and 1951 for the needs of fruit and vegetable growers (timing of sprays to fruit trees, infestation of corn ear worm, killing frosts). Long range rainfall forecasts were successful, autumn frost predictions were discouraging. *Subject Headings:* **1. Agrometeorological forecasting 2. Agrometeorological services 3. Long range forecasting 4. Canada.**—*A.A.*

8C–126 551.509.59:63

Kerr, I. S. (*New Zealand Met. Service*), **Weather forecasting as it affects farmers.** Photostat of unidentified reprint, p. 174–182. **DWB**—A general discussion of how weather and climate affect agriculture, and of the essential success of short and long range forecasts and of weather modification with emphasis on New Zealand. Early attempts at rainmaking in Australia are cited. *Subject Headings:* **1. Agrometeorological forecasting 2. Weather control 3. New Zealand.**—*M.R.*

8C–127 551.509.58:656.7(469)

Lanier, William H. (*T.W.A., Lisbon*), **Function of meteorology in flight planning and dispatch. Portugal.** *Serviço Meteorológico Nacional, RT* 101, *Mem.* 14, Jan. 15, **1952.** 7 p.—The author believes that "it would be advantageous if the meteorologists who provide forecasts for use in flight planning and dispatch were to have a more comprehensive idea of just how these forecasts are used." Various phases of flight planning and flight dispatch are mentioned and examples of the effect of weather forecasts on calculation of flight time, required fuel and admitted load are given. The author concludes by pointing out the considerable financial loss caused by an unnecessary delay or by the necessity to land at an alternate airport, due to a mistake in flight dispatch. *Subject Headings:* **1. Aeronautical meteorology 2. Flight plans 3. Flight forecasts.**—*G.T.*

8C–128 551.509.58:632.187 551.509.52

Legg, Edwin M. (*U. S. W. B., Pomona, Calif.*), **Forecasting the Ellensburg surface wind.** [Seattle-Tacoma Airport, U. S. Weather Bureau Office, Sept. 10, **1951.**] [4 p.] Mimeo. **DWB**—Purpose of study was to improve fire weather forecasts in Ellensburg area. July and Aug. data for 1948, 1949 and 1950 were used. Surface pressure gradients in several directions across Ellensburg, and afternoon temperatures at Seattle as well as air mass type and location of center of high and low pressure areas were considered as parameters. No upper air charts or data were tested. Results were inconclusive, though 186 cases were studied. *Subject Headings:* **1. Objective forecast studies 2. Surface wind forecasting 3. Fire weather forecasting 4. Ellensburg, Wash.**—*M.R.*

8C–129 551.509.59:551.586:634.23(521.16)

Sato, Yoshimasa and Yoshida, Hideo, **A note on full bloom forecasting of cherry blossom at Fukushima City.** *Sendai, Japan. Central Meteorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District,* 8(2):549–553, Jan. **1955.** 3 figs., 5 tables, 5 refs., 3 eqs. In Japanese; English summary p. 549. Also in: *Journal of Meteorological Research,* Tokyo, 6(10/11): 549–553, Dec. **1954. DWB**—Empirical formulas for bloom forecasting are presented. These are as follows: $x\ a_5+b_{10}-c_0$—where a_5 and b_{10} are the number of days on which the daily mean air temperature at Fukushima is above 5°C and 10°C in Feb. and March respectively, and the number of days the temperature is below 0°C in March. The date of full bloom y is given by $y=22-\frac{1}{2}x-\frac{9}{4}\Delta t$, where Δt is the deviation of mean air temperature from normal for the first 10 days of April. The correlation between the date of full bloom of cherry blossoms and average air temperature for each successive 10 days from Jan. to April is expressed by $y=37.6-\frac{4}{10}(x)$ where (x) is accumulated temperature weighted by a coefficient. *Subject Headings:* **1. Cherry blossom forecasting 2. Fukushima, Japan.**—*Based on authors' abstract.*

8C–130 551.509.58:629.13(04)

Shanklin, H. A., **Weather of the plains.** *Air Facts,* N. Y., 15(3):15–26, March 1, **1952. DLC**—A popular discussion of the basic principles of forecasting for cross country flights. Difficulties due

to complicated processes are explained and a warning given against over-simplified rules or methods. The pilot should understand how to read and interpret surface and upper level pressure charts. *Subject Heading:* **1. Flight forecasts.**—*M.R.*

8C–131 551.509.5:6

She sells weather. *Sales Management*, Chicago, 69(7), Pt. 1:110–112, Oct. 1, **1952. DWB**—Business operations of MARION HOGAN, head of Weather Services, Inc., Boston, are described. The company specializes in preparing weather forecasts for individual business enterprises. Examples are given of the application of forecasts to purposes of bakeries, department stores, traffic companies, clothing stores, snow disposal enterprises, restaurants, fruit growers, etc. MISS HOGAN's responsibilities include authority to shut down the U. S. Steel Company's Donora zinc mill if there is a serious threat of smog. *Subject Heading:* **1. Industrial forecasting.**—*G.T.*

8C–132 551.509.32:629.135.2

Thompson, James K. (*Wright Air Development Center*), **All-weather flight concern of the pilot and weather forecaster.** *Aeronautical Engineering Review*, N. Y., 15(7):63–66, July **1956.** 7 figs. **DWB, DLC**—Graphs and tables show order of magnitude of variation in turbulence and icing conditions which would be encountered by planes flying at speeds varying from 180 to 400–500 kn. The same plane will vary its speed tremendously depending on whether it is climbing, cruising, descending, attempting maximum range or maximum speed or maximum endurance. Hence the forecaster is up against a communication problem that is formidable but which he can solve better than can the pilot whose work load is excessive at the time when these severe conditions are encountered. *Subject Headings:* **1. Aviation forecasting 2. Forecaster-pilot communication 3. Icing forecasts 4. Turbulence forecasts.**—*M.R.*

8C–133 551.509.5:63

Thran, P., **Beurteilung der landwirtschaftlichen Produktion mit Hilfe der Wetter-Ertrags-rechnung.** [Estimation of agricultural production by means of weather-yield calculation.] *Germany. Deutscher Wetterdienst in the U. S. Zone, Berichte*, No. 32, **1952.** p. 97–98. 3 figs. Also his: **Kurze Erklärung der Wetter-Ertragsrechnung.** [Brief explanation of weather-yield calculation.] *Ibid.*, p. 99–101. Also: Brouwer, W., **Bemerkungen zur Wetter-Ertragsrechnung des Dr. Thran.** [Remarks on the weather-yield calculation of Dr. Thran.] *Ibid.*, p. 101–102. Also: Baumann, H., **Stellungnahme zur Wetter-Ertragsrechnung von Dr. Thran** [Statement on the weather-yield calculation of Dr. Thran.] *Ibid.*, p. 102–103. Also: Thran, P., **Entgegnungen zur Kritik an der Wetter-Ertragsrechnung von Prof. Brouwer und Prof. Baumann.** [Replies to Prof. Brouwer's and Prof. Baumann's criticism of weather-yield calculation.] *Ibid.*, p. 103–106. 3 tables. **DWB**—In the first article THRAN presents further applications of his forecasting methods (*see Annalen der Met.*, 1:326, 1948) and shows the important influence of additional fertilizing. The difference between the observed yield and the yield computed by means of meteorological values reached the greatest negative value in 1945 (poor fertilizing) and is positive since 1950. In the second article THRAN calculates the most favorable weather conditions for the best yield. Any positive or negative deviations diminish the yield. The final calculation of the "weather damage factor" must be adapted to each individual case, since it does not possess universal validity. BROUWER thinks that the calculation of the influence of weather on yield is important, but the methods applied by THRAN are too uncertain. BAUMANN admits that the empiric methods of THRAN are partially correct and useful, but objects that it is not possible to interpret the results quantitatively. THRAN in his reply to BROUWER and BAUMANN, gives further verification of his method. *Subject Headings:* **1. Agricultural meteorology 2. Crop yield forecasting.**—*A.A.*

8C–134 551.509.59:621.396.81

Ueno, Kiyoshi (*Komuro Receiving Sta., Min. of Telecommunications*), **Comparison between the prediction and the actual operation of the telephone circuit.** *Japan. Science Council. Ionospheric Research Committee, Report of Ionosphere Research in Japan*, 5(4):185–186, **1951.** 2 figs. **DWB**—The actually operated best frequencies between Tokyo and San Francisco are compared with values predicted two months in advance by the Central Radio Wave Observatory in Tokyo. A good agreement is found for the monthly means but they cannot be used as reliable in daily operations. *Subject Headings:* **1. Radio propagation prediction 2. Wireless communication.**—*A.A.*

8C–135 551.509.58:656.6(02)

U. S. Air Weather Service, **Weather briefing.** Its **Air Weather Service Manual, 105–123,** June **1951.** 24 p. figs. **DWB**—Manual discusses standard practices recommended for weather briefing by Air Weather Service personnel, including visual aids, preparation of charts, types of briefing (individual pilot, group briefing, command and staff briefing, mission indoctrination, etc.) and debriefing. Finally, appendix gives type of information required for Korean operations of various types. *Subject Headings:* **1. Weather briefing 2. Service manuals.**—*M.R.*

8C–136 551.509.59:551.594.7

Unusually good radio weather forecast by RCAC wave analyst. *Wire and Radio Communications*, N. Y., 72(8):24, Aug. **1954.** chart. **DWB**—Radio reception forecast success of 90% during 1953 due to use of planetary configuration rather than sunspot information. *Subject Headings:* **1. Radio reception forecasts 2. Planetary influences.**—*M.R.*

8C–137 551.509.59:63

Weather forecasts and the Scottish farmer. *Weather*, 10(11):382–384, Nov. **1955. DWB**—Quotations of favorable and unfavorable opinions expressed by Scottish farmers about Meteorological Office and B.B.C. forecasts. *Subject Headings:* **1. Agrometeorological forecasting 2. Scotland.**—*C.E.P.B.*

SUPPLEMENTARY MATERIAL

8C–138 551.509.32:551.515

*George, Joseph Johnson; Roche, R. D.; Vischer, H. B. et al., **Forecasting relationships between upper level flow and surface meteorological processes.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 23, Aug. **1953.** 186 p. 101 figs., numerous tables (some fold.), 10 refs. Its AFCRC Technical Report 53-28. **DWB**—Empirical methods of practical forecasting are designed and developed for use in the following: the prediction of cyclogenesis in the eastern portion of the United States, applicable to warm cyclones only; the prediction of track, speed and future intensity for certain classes of cyclones already established; the speed and track of cold anticyclones over the entire United States and southern Canada; and the 24-hr future position of cold fronts over the United States east of the Rockies. Classification of cyclones has been made according to the direction of past movement and the direction of the upper currents above the cyclones. Cold fronts are divided into two categories according to their orientation; east-west types are further subdivided according to the area in which they are located. All final forecasting diagrams show the distribution of data used to construct them. Essentially all prediction methods have been tested with independent data and the results are shown. Tables showing complete data are included as appendixes. *Subject Headings:* **1. Objective forecasting 2. Cyclogenesis forecasting 3. Cyclone forecasting. I. Shafer, Robert J. II. Funke, P. W. III. Whiting, R. M.**—*Authors' abstract.*

8C–139 551.515.127:551.513.1

Gulick, J. R. (*U. S. W. B.*), **Some attempts to determine long wave positions by quantitative means.** [1952.] 12 p. 2 graphs. Typescript. **DWB**—The author describes various methods he used in his effort to determine the position of long atmospheric pressure waves existing in the circumpolar westerlies. The first approach was based on daily graphs representing three-day means of daily continuity charts constructed by plotting the mean height of the 500-mb surface. The refinements added to this method included the use of a moving system of coordinates representing the displacement of the long wave pattern. A different approach consisted in subtracting the short wave pattern from the given map, thereby leaving the long waves. Curves obtained by this method are presented and discussed. The author concludes by pointing out that "no method has been found which maintains reliability during periods of marked change in the long wave pattern," even though satisfactory results have been obtained in some cases. *Subject Headings:* **1. Synoptic analysis 2. Long wave displacement. I. U. S. Weather Bureau.**—*G.T.*

PART III. REVIEWS, TRANSLATIONS, REPRINTS, ROUTINE DATA PUBLICATIONS, AND ANALYTICS FROM RECENT SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIA

Bannon, J. K. and Gilchrist, A.: **Variation of temperature in the troposphere and the lower strat sphere.** (In) *Royal Meteorological Society, Quarterly Journal*, 82(351):58–74, Jan. 195 Review in *Rivista di Meteorologia Aeronautica*, Rome, 16(3):51, July/Sept. 1956. (*See* 7.6–14 June 1956, *MAB*)

Baur, Franz: **Physikalisch-Statistische Regeln als Grundlagen für Wetter und Witterungsvorhe sagen, Pt. 1** [Physico-statistical principles as bases for weather and weather forecasting, Pt. 1 Frankfurt a.M., Akademische Verlag, 1956. 138 p. 30 figs., 76 tables. Price, 42 DM Review by J. M. Craddock in *Royal Meteorological Society, Quarterly Journal*, 83(355):136–13 Jan. 1957.

Beckinsale, R. P.: **Land, air and ocean.** London, Gerald Duckworth, 1956. 370 p. illu Price, 25 sh. Review by H. H. Lamb in *Meteorological Magazine*, London, 85(1,011):279–28 Sept. 1956. (*See* 8.3–6, March 1957, *MAB*)

Böer, Wolfgang: **Klimaforschung im Dienste des Städtebaues** [Climate investigations and ci planning]. Berlin, Deutsche Bauakademie, 1954. 60 p. 19 figs. (*Schriften der Forschung institut für Städtebau*). Price, DM 3.20. Review by G. Grundke in *Petermanns Geographisc Mitteilungen*, Gotha, 100(2):143, 1956. Review by Janusz Paszynski in *Przegląd Geograficzn* Warsaw, 28(3/4):650–652, 1955.

Boughner, C. C.; Longley, R. W. and Thomas, M. K.: **Climatic summaries for selected meteor logical stations in Canada, Vol. 3, Frost data.** Toronto, Canada (Meteorological Div., Dep of Transport), 1956. 94 p. Mostly tables. Price, $.30 from Queen's Printer, Ottawa, Ontari Review by O. M. Ashford in *World Meteorological Organization, WMO Bulletin*, 6(1):44, Ja 1957.

Buchanan, K. H. and Pugh, J. C.: **Land and people in Nigeria.** Univ. of London Press, 195 252 p. Maps and illus. Price, 35 sh. Review in *Geographical Journal*, London, 122(3):38 384, Sept. 1956.

Chaldecott, J. A.: **Handbook of the collection illustrating temperature measurement and contr Pt. 2, Catalogue of exhibits with descriptive notes.** London, Science Museum, 1955. 57 6 plates. Price, 3 sh, 6 d. (*See* 6.9–45, Sept. 1955, *MAB*) Also his, **Handbook of the collecti relating to heat and cold, Pt. 2, Descriptive catalogue.** 1954. 64 p. Review of both by Degen in *Naturwissenschaftliche Rundschau*, 10(1):39, Jan. 1957.

Daniel, Farrington and Duffie, John A. (eds.): **Solar energy research.** London, Thames a Hudson; Madison, Wisconsin, Univ. of Wisconsin Press, 1955. 290 p. 53 figs., 17 tabl 272 refs. Price, 30 sh. Review in *Science and Culture*, 22(3):186, Sept. 1956. (*See* 6.11–1 Nov. 1955, *MAB*)

Davos, Switzerland. Eidgenössisches Institut für Schnee- und Lawinenforschung: **Schnee u Lawinen in den Schweizeralpen, Winter 1953/1954** [Snow and avalanches in the Swiss Al winter of 1953/1954]. Its *Schnee und Lawinen im Winter, Winterberichte*, No. 18, 1955. 128 64 figs. (incl. photos), 56 tables. Review by N. Untersteiner in *Die Umschau*, 57(2):62, Ja 1957.

Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dien **Anleitung für die Beobachter an den Wetterbeobachtungsstellen des Meteorologischen u Hydrologischen Dienstes der DDR** [Instructions for observers at weather observation statio of the Meteorological and Hydrological Service of the German Democratic Republic]. New Berlin, Akademie Verlag, 1953. 276 p. 56 figs. Review by Mrs. András Békéssy in *Időjár* Budapest, 70(2):123–124, March/April 1956.

Golding, E. W.: **Generation of electricity by wind power.** London, Spon, 1955. 318 p. 101 figs., bibliog., numerous refs. Review by R. Frith in the *Meteorological Magazine*, 85(1,014):378–379, Dec. 1956. (*See* 7.11–5, Nov. 1956, *MAB*)

Handbuch der Geophysik, Vol. 8, Physik der Atmosphäre, Chap. 12, 13, and 14. Ed. by F. Linke and F. Möller. Berlin, Gebrüder Borntraeger, 1955–1956. 174 p. 65 figs., 31 tables. Review by R. M. Goody in *Royal Meteorological Society, Quarterly Journal*, 83(355):137, Jan. 1957.

Jagsich, Juan: **Meteorología física: el tiempo** [Physical meteorology: the weather]. Buenos Aires, Editorial Kapelusz, 1954. 547 p. 508 figs., 16 tables. Review by G. Fochler-Hauke in *Petermanns Geographische Mitteilungen*, Gotha, 100(2):142–143, 1956. (*See* 5.10–5, Oct. 1954, *MAB*)

Journal of Fluid Mechanics, N. Y., Vol. 1, Pt. 1, ed. by G. K. Batchelor. Issued by Taylor and Francis, London, May 1956. Price, £5.10.0 per vol. of 6 Pts. Review in *Royal Meteorological Society, Quarterly Journal*, 83(355):136, Jan. 1957.

Kratzer, P. Albert: **Das Stadtklima** [Town climate]. 2d ed. rev. Brunswick, F. Vieweg und Sohn, 1956. 176 p. 78 figs. Price, DM 24. Review by F. Sauberer in *Wetter und Leben*, Vienna, 8(3/4):84, 1956.

B. TRANSLATIONS, REPRINTS AND ROUTINE DATA PUBLICATIONS

TRANSLATIONS

aufm Kampe, H. J.: **Feuchtigkeitsverhältnisse in Cirruswolken und die daraus resultierenden Formen der Eiskristalle** [Humidity conditions in cirrus clouds and the resulting ice crystal forms]. (In) *Germany. Deutsche Wetterdienst in der US-Zone, Berichte*, No. 38:298–302, 1952. 8 figs., table, 10 refs., 8 eqs. Translation into English by Bronislas de L. Jezierski and James Gough, Jr. Issued by the American Meteorological Society under Contract AF19(604)-1364, June 1956. 8 figs., etc. (For abstract on original, *see* 4.2–181, Feb. 1953, *MAB*)

Bagrov, N. A. and Morskoi, G. N.: **Metod otsenki prognozov** [Method of evaluating forecasts]. (In) *Meteorologiia i Gidrologiia*, Leningrad, No. 4:24–28, July/Aug. 1955. fig., 5 tables, refs., eqs. Trans. into English, issued Oct. 26, 1955(?). Photostat of typescript. 11 p. fig. etc. Available at DWB. (*See* 7.9–115, Sept. 1956)

Eyraud, R.: **Influence des courants verticaux sur les avions** [Influence of vertical currents upon aircraft]. (In) *Journal Scientifique de la Météorologie*, No. 1:23–31, 1949. 8 figs., 36 eqs. Trans. into English by B. de L. Jezierski. Issued by American Meteorological Society under Contract AF 19(604)-1364, May 1956. 8 figs., etc.

Flohn, Hermann: **Über kalte metastabile Hochdruckgebiete (Statistisch-synoptische Untersuchungen, I)** [Cold metastable high-pressure areas: synoptic statistical investigations, Pt. 1]. (In) *Meteorologische Rundschau*, 2(3/4):67–75, March/April, 1949. 9 figs., 3 tables, 43 refs. Trans. into English by James Gough, Jr. Issued by American Meteorological Society under Contract AF 19(604)-1364, Feb. 1956. 43 p. 9 figs., etc. (*See* 2–94, Feb. 1950)

Israël, Hans: **Luftelektrische Erfahrungen in den Polargebieten** [Atmospheric-electric observations in the Polar regions]. (In) *Polarforschung*, Ser. 3, 23(1/2):210–215, 1953, pub. 1954. illus. 10 refs. Trans. into English by Valda Dreimanis. Issued by American Meteorological Society under Contract AF 19(604)-1364, Aug. 19, 1955. 12 p. (*See* 7.7–263, July 1956)

Khrgian, A. Kh.: **Outline on the development of meteorology, ch. 2, Climatology of recent times.** (Translation of Ch. 2 of his original Russian, **Ocherki razvitiia meteorologii.** Leningrad, Gidromet. Izdat, 1948). 33 p. offset of typescript. (For abstract of whole book, *see* 1–34, Jan. 1950, *MAB*)

REPRINTS

Frenkiel, F. N. and Katz, I.: **Studies of small-scale turbulent diffusion in the atmosphere.** Johns Hopkins Univ. Applied Physics Laboratory, Contract NOrd 7386, (Report) CM-852, Aug. 1955. 30 p. 9 figs., 3 tables, 9 refs., 11 eqs. (For abstract on this paper from another source, *see* 7.11–215, Nov. 1956, *MAB*)

Ramanathan, K. R.: **Atmospheric ozone and the general circulation of the atmosphere.** *International Union of Geodesy and Geophysics. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, 1956. p. 3–24. 17 figs., table, 32 refs. (*See* 7.6–103, June 1956)

Schumann, T. E. W.: **Proposal for a planned international research programme.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* pub. 1956. p. 237–247. fig. (*See* 6.8–115, Aug. 1955)

Väisälä, Vilho: **Theory of the lag coefficient of hygroscopic hygrometers.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* pub. 1956. p. 363–368. 2 figs., 3 tables, 14 eqs. (*See* 5.2–59, Feb. 1954)

ROUTINE DATA PUBLICATIONS

Blue Hill Meteorological Observatory: [**Report on**] **Blue Hill Meteorological Observatory, reprinted from the Report of the President of Harvard College and Reports of Departments, 1954/1955.** Its *Reprint*, No. 1, 1956. 23 p. Publications of the Staff, p. 20–23. (*See* 7.1–51, Jan. 1956 for 1951/1952 and 1952/1953 issues; *see* 7.5.17, May 1956 for 1953/1954 issue)

Bolivia. Servicio Meteorológico: **Boletín Anual Meteorológico, 1952** [Annual Meteorological Bulletin, 1952]. pub. La Paz, April 1955. unpaged. Almost entirely tables. (*See* 4.7–32, July 1953, *MAB* for 1951 issue)

British Caribbean Meteorological Service, Port-of-Spain, Trinidad: **Annual Report, 1954, and 1955.** pub. 1955 and 1956. 11 and 18 p. each. (*See* 5.3–118, March 1954 for 1952 report)

East Africa High Commission. Meteorological Dept.: **Summary of rainfall for the year, 1955, Pt. 1, Kenya.** Issued June 1956. 50 p. almost entirely tables. (*See* 3.7–159 July 1952, *MAB* For 1950 report)

Finland. Ilmatieteellinen Keskuslaitos: **Sade- ja Luminhavaintoja Suomesta** [Precipitation and snow observations in Finland]. 1941, 1942, 1943, 1944, pub. Helsinki, 1952–1955. about 70 p. each. almost entirely tables. Its *Suomen Meteorologinen Vuosikirja* [Meteorological Yearbook of Finland], *Pt. 2*, Vol. 41–44. (*See* 4.5–166, May 1953, for 1939 and 1940 issues)

Germany, Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst: **Deutsches Meteorologisches Jahrbuch, 1954, Teil 4, Heft 3, Beobachtungen des Aerologischen Observatorium Lindenberg** [German Meteorological Yearbook, 1954, Vol. 4, Pt. 3, Observations of the Lindenberg Aerological Observatory]. Issued Berlin, 1956. 216 p. Almost entirely tables. (*See* 6.9–91, Sept. 1955 for 1953 issue)

Hong Kong. Royal Observatory: **Meteorological Results, 1953, Pt. 2, Upper Air Observations. Also 1954, Pt. 2.** both pub. Hong Kong, 1955. About 90 p. each. mostly tables. Price, $6.00 each. (*See* 7.4–98, April 1956 for 1952 issue)

Netherlands. Meteorologisch Instituut: **Upper Air Data, Vol. 37, 1952.** Issued Utrecht, 1955. unpaged. Almost entirely tables. (*See* 5.10–43, Oct. 1954 for 1950 and 1951 issues)

C. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Acta Geophysica Polonica, Warsaw, Vol. 4, No. 2, 1956

Dębski, Kazimierz: **Lignes courbes de probabilité des phénomènes hydrologiques et météorologiques,** [Probability curves for hydrological and meteorological phenomena], p. 59–90

Mergentaler, Jan: **Obserwacje plam słonecznych w 1955 r,** [Sunspot observations 1955], p. 91–94

Kalinowska-Widomska, Ewa: **Results of magnetic observations made during the total solar eclipse of 30. VI. 1954 at the Geophysical Observatory in Świder and at the supplementary station at Ogrodniki,** p. 95–111

Lisowski, Bolesław: **O zmianach dziennych słonecznych Są deklinacji magnetycznej w Swidrze w dniach spokojnych,** [Solar daily variations of magnetic declination at Świder on quiet days], p. 112–121

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